YALE ECONOMIC ESSAYS

VOLUME I NUMBER I

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This journal is intended to serve two principal functions. All doctoral dissertations in economics accepted at Yale University will be published in its pages either in full or in extended summary. It is also a medium for economic comment and analysis by faculty, students, and graduates in economics of Yale University.

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SUCCESS CRITERIA FOR ECONOMIC SYSTEMS 3
Bela A. Balassa, Assistant Professor of
Economics at Yale University
Dissertation Committee: Professors Lloyd Reynolds
(Chairman), Robert Triffin and John Perry Miller

The author endeavors to devise a set of success indicators, the appraisal of which would be necessary in order to evaluate any economic system. Five such indicators are presented: efficiency in resource allocation, dynamic efficiency, the rate of growth of national income, consumer satisfaction, and the distribution of income.

Some of these variables are competitive, others partly cumulative, but for the latter there is at least one variable which serves as a restraint. It would be necessary, for appraising various economic systems, to devise a possibility function indicating the maximum attainable values of any success indicators, given the values of the other variables. In addition, there is need for a social welfare function which would indicate the preferences of the society for the various indicators.

After an examination of the blueprints of different economic systems in the light of these success criteria, the author reaches the conclusion that economic arguments are not sufficient to choose between these blueprints. The success indicators will be of use, however, in evaluating the performance of real-world economies.

A TEST FOR THE PRESENCE OF COST INFLATION IN THE UNITED STATES 1955-57 28
Edmund S. Phelps, Assistant Professor of
Economics at Yale University
Dissertation Committee: Professors Arthur Okun
(Chairman), William Fellner and Mark Leiserson

A familiar hypothesis is that labor unions in this country have, since the war, put heightened pressure on costs and prices so that when unemployment approaches a prosperity level, as in the years 1955-57, a wage-push or cost inflation results. This study seeks to determine whether there was any more wage push present in the 1955-57 inflation than in earlier postwar inflations, during which most agree there was little or no wage push.

Two kinds of evidence for this hypothesis are considered. Aggregated data on distributive shares, the rate of growth and the degree of unemployment are examined first. It is largely this evidence which prompted the wage-push interpretation of the 1955-57 inflation.

A different type of test is then presented which draws upon the price and output data of major industries and sectors within the economy, and which is founded upon certain properties of multicommodity general equilibrium models. The outcome of this approach gives qualified support to the hypothesis tested.

LIFE INSURANCE INVESTMENT — THE EXPERIENCE OF FOUR COMPANIES 70

Leroy S. Wehrle, Assistant Program Officer, International Cooperation Administration Mission in Laos
Dissertation Committee: Professors Arthur Okun (Chairman), Challis Hall and Lawrence Krause

Theories of the interest rate are largely based on assumptions concerning the individual investor's preferences toward risk and return. Yet today the individual investor is being surplanted by financial institutions whose demands for securities are influenced by the type of liability contract which they issue. This essay presents an empirical examination of the demand for securities for a specific financial intermediary, life insurance companies.

The portfolios of four United States life insurance companies are examined for the period 1947-57. Various statistics are computed for the portfolios including yields, capital gains and losses on sales, maturities, liquidity balances, etc. These statistics are then interpreted in terms of a theory of portfolio selection.

The companies studied place emphasis on increasing yields and are very responsive to yield differentials among different maturity assets. No evidence is found of cyclical patterns of liquidity holdings; and life companies do not attempt to choose maturities on the basis of short-term interest forecasts.

Finally, monetary and debt policy implications of the analysis are examined. A conclusion of the study is that life insurance companies are sophisticated and knowledgable investors who contribute to the perfection and vitality of current capital markets.

GOVERNMENT SECURITIES ON COLONIAL NEW ISSUE MARKETS: AUSTRALIA AND CANADA, 1895-1914 137

Ian M. Drummond, Lecturer in Political Economy, Trinity College, University of Toronto
Dissertation Committee: Professors John Sawyer (Chairman), Gerald Meier and Charles Berry

This essay is a study of the working and development of capital markets in two colonial economies which were settled from Europe and closely linked commercially and financially with Great Britain. The structural similarities and differences of the two economies are compared, followed by a description of organized securities trading, and of the nature and extent of foreign and domestic borrowing. Finally, methods of issue, sources of funds, and the importance to the evolution of new issue markets of the markets in government securities are discussed.

The argument attempts to show how, in Australia and Canada between 1895 and 1914, financial intermediaries developed in such ways as to meet demands for extended-term credit in the various sectors of the two economies; furthermore, it is argued that, as these demands changed, the financial systems were sufficiently adaptable to adjust their behavior in equilibrating ways - even though the institutions themselves were somewhat primitive and unspecialized. That is, capital markets were not sufficiently disorganized to impede the growth process. Some efforts are made to explain this.

SUCCESS CRITERIA FOR ECONOMIC SYSTEMS*

Bela A. Balassa

1. The Socialism versus Capitalism Controversy.

The discussion of the problem of socialism versus capitalism has a long history. We may begin the period of modern controversy, however, with the publication of E. Barone's famous article, "The Ministry of Production in the Collectivist State."[1] Examining the question whether centralized decision-making can replace the free market, Barone concludes that such a solution—although theoretically possible—would run into practical difficulties because of the gigantic task of collecting data and the continual change of technological coefficients.

Barone, then, ignited the fire of discussion; others have supplied fuel to keep it blazing. Without attempting to review the debate[2] we can briefly summarize it by stating the standpoint of the participants, classified into four main groups.

I. L. von Mises flatly maintains the impossibility of economic calculation in a socialist economy.[3] He is equipped with arguments even against those who cite the Soviet Union and Nazi Germany as cases of successful planning, contending that "these socialist states base the calculations on which they make their decisions on the prices established abroad. Without the help of these prices their actions would be aimless and planless ... socialism will result in complete chaos ... if it is applied in the greater part of the world."[4]

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* My thanks are due to Professors William Fellner, Lloyd Reynolds, and Robert Triffin for advice and criticism. This paper, which was written in May, 1959, is an enlarged version of the first chapter in my book, The Hungarian Experience in Economic Planning, published in November, 1959, by the Yale University Press as Volume 11 of the Yale Studies in Economics.

1. Translated from the Italian original of 1908 in F. A. Hayek, ed., Collectivist Economic Planning (London, Routledge, 1935), pp. 245-290.

2. For an excellent survey, see A. Bergson, "Socialist Economics," in A Survey of Contemporary Economics (Homewood, Ill., Irwin, 1948), pp. 412-448.

3. His position was originally stated in a German article in 1920, the English translation of which was published in Collectivist Economic Planning under the title "Economic Calculation in the Socialist Commonwealth," pp. 87-130.

4. Omnipotent Government (New Haven, Yale University Press, 1944), p. 55. Recently a similar argument was offered in a revised edition of

II. The leading theorists belonging to the second group are F. A. Hayek and L. Robbins; a brief but apt description of their views has been given by O. Lange: "They do not deny the theoretical possibility of a rational allocation of resources in a socialist economy; they doubt the possibility of satisfactory practical solution of the problem."[1]

Robbins has occupied himself with Barone's problem of centralized decision-making, envisaged as the mathematical solution of "a system of simultaneous equations ... whose solution would show the equilibrium distribution of factors and the equilibrium production of commodities," where the equations should contain consumers' and resource holders' preferences and the technological possibilities of production. According to Robbins, "in practice this solution is quite unworkable."[2] The words "unworkable" and "unpracticable" appear frequently in Robbins' and Hayek's writings. I suspect that for many people these expressions have emotional connotations, implying that there is no solution; yet Hayek at one place gives a perfectly clear statement interpreting them as meaning inefficient:

> It was not the possibility of planning as such which has been questioned on the grounds of general considerations, but the possibility of successful planning, of achieving the end for which planning was undertaken.... There is no reason to expect that production would stop, or that the authorities would find difficulty in using all the available resources somehow, or even that output would be permanently lower than it had been before planning started. What we should anticipate is that output, where the use of available resources was determined by some central authority, would be lower than if the price mechanism operated freely under otherwise similar circumstances.[3]

Hayek considers primarily the allocation of given resources among alternative ends at a certain point of time, and argues that a socialist system is less efficient than free enterprise because of lack of incentives, the need for bureaucracy, and the abrogation of consumers' sovereignty.

III. On the socialist side the so-called "market solution" is

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Socialism (New Haven, Yale University Press, 1951), p. 119.

1. "On the Economic Theory of Socialism," in B. E. Lippincott, ed., On the Economic Theory of Socialism (Minneapolis, University of Minnesota Press, 1938), p. 62. Italics in the original.

2. The Great Depression (London, 1934), p. 151.

3. "The Present State of the Debate," in Collectivist Economic Planning, pp. 203-204.

represented by Lange,[1] H. D. Dickinson,[2] and, in his earlier writings, A. P. Lerner.[3] The market solution maintains that a socialist economy can work in basically the same way as a freely competitive system if production decisions are decentralized and the planning board assumes the price-determining functions of the market mechanism. Prices are determined by trial and error, the right prices being those at which demand and supply balance. The managers act according to rules essentially corresponding to profit maximization. Free consumers' choice and free choice of occupation are presupposed. Another form of market socialism, the so-called Yugoslav solution, dispenses with the price-fixing function of the planning board. Prices are determined on a competitive market, which consists of socialist firms. This solution was foreseen by Dickinson.[4]

IV. Another group of socialist economists, including M. Dobb[5] and P. M. Sweezy,[6] favor centralized planning. Whereas the planning board in the original form of the market solution is essentially a price-fixing agency acting according to the rules of the competitive market, in the centralist scheme the planning board makes all or most of the essential production and investment decisions. The proponents of centralized planning usually postulate the physical allocation of resources by the central authorities instead of the use of the price mechanism, and maintain the necessity for overruling consumers' preferences.

Many of the participants in the debate (with some exceptions, like Lerner, who now favors a mixed system) stick to their original views. Two quotations selected at random reflect the inflexibility in their thinking. Mises contends: "The intellectual bankruptcy of the socialist doctrine can no longer be disguised... The avowal of socialist ideas is to-day the proof of complete ignorance of the basic problems of economics."[7] On the other side, in the foreword to Douglas Jay's The Socialist Case, the former

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1. "On the Economic Theory of Socialism," pp. 56-142. Lange at present professes different views.

2. Economics of Socialism, Oxford University Press, 1939.

3. "Economic Theory and Socialist Economy," Review of Economic Studies, II (October 1934), pp. 51-61, and "Statics and Dynamics in Socialist Economics," Economic Journal, XLVII (June 1937), pp. 253-270.

4. Economics of Socialism, pp. 104-105.

5. On Economic Theory and Socialism (New York, International Publishers, 1954) and Political Economy and Capitalism (New York, International Publishers, 1945), especially ch. 8.

6. Socialism (New York, McGraw-Hill, 1949).

7. Ibid., p. 586.

British prime minister Clement Attlee asserts: "I believe myself that these arguments [for socialism] are unanswerable . . ."[1]

But where is truth to be found: In Bergson's opinion the controversy boils down to the question, "Which is more efficient, socialism or capitalism?" He continues: "As we see it, it is now the only issue outstanding. The discussion in the preceding sections, it is hoped, will provide a partial basis for judgment in this important matter. For the rest . . . we leave this issue too for the reader to decide."[2]

In the opinion of the present writer the question to be answered first is whether there is a possibility of devising an objective test which can be used in comparing the efficiency of economic systems. Bergson also suggests that some kind of an "efficiency test" should be agreed upon, but he does not go further. The fundamental problem remains: Is there a test or formula that can serve in reaching rigorously reasoned conclusions? This question will be taken up in this paper.

2. Choice in a Dynamic World.

Pareto defined an efficient (optimum) position by the requirement that there should not exist any possible reallocation of resources which would make anybody better off without making somebody else worse off. It has been recognized that—within certain simplifying assumptions—efficient resource allocation can be achieved in pure competition.[3] But the distribution of income resulting from pure competition may be considered as undesirable. It is conventionally assumed that the distribution of income can be changed without impairing efficiency by lump-sum redistributions.[4]

In a static system the fulfillment of the conditions for Pareto optima would supply us with a test of efficiency on the basis of which different economic systems could be evaluated. Since we do not live in a static world, such a test would not lead us very far. Whereas under static conditions the only variable considered is the efficient allocation of resources at a given point of time, in a dynamic world we have more variables to consider than mere static efficiency; next to it, the dynamic efficiency of the system, the attainable growth rate, consumer satisfaction, and the distribution of income are those of basic importance.[5] Considering these

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1. London, Faber and Faber, 1946, p. vii.

2. "Socialist Economics," p. 447.

3. For a recent exposition and references see T. C. Koopmans, Three Essays on the State of Economic Science (New York, McGraw-Hill, 1957), pp. 41-66.

4. By lump-sum redistribution is meant a system of taxes and subsidies which, not being anticipated, do not affect the individual's effort and risk-taking.

5. These concepts will be defined and examined in the next section.

variables as success indicators, the following is needed for the evaluation of different economic systems:

I. Success Indicators. We have to extend the meaning of "efficiency test," since efficiency (static and dynamic) does not exhaust the list of variables on the basis of which a conclusion with regard to different economic systems should be reached. We can assume that different values of our success indicators[1] can be achieved under conditions postulated in various economic systems. Some of the variables are partly cumulative, in the sense that an increase in A leads to an increase in B (for example, an improvement in dynamic efficiency leads to an increase of the growth rate); some are competitive, in the sense that the increase in the value of C leads to the reduction in the value of D (for example, an equal distribution of income is likely to lead to less efficient resource allocation, or a higher growth rate requires the restriction of present consumption). But even for partly cumulative variables there must be at least one other variable which serves as a restraint, the reduction of which is needed for a further increase in the former variable. In other words, for any economic system there is a maximum attainable value of any one variable, given the values of the other variables. The maximum values of the success indicators obtained in this way show the performance of the system. For example, an economic system may achieve a higher degree of static efficiency and more equitable income distribution and be nearer to full employment than another system which has a higher degree of dynamic effiency and a higher growth rate.

II. Scale of Preferences. There is only one case where there is no difficulty in choosing between two economic systems. This is the trivial case when in system Z a higher value of all five success indicators can be achieved than in system W. If some of the success indicators show a higher value in one, some in another economic system, we need additional criteria for choosing between them. One has to decide which success indicators are of greater importance, which have higher priority; in other words, a scale of preferences is needed. The choice between economic systems should be made on the basis of their proficiency in the various fields enumerated above, given a certain scale of preferences with regard to the success indicators.

We face two questions here: Can we determine theoretically the workings of different economic systems with regard to our success indicators; and can we construct some kind of a preference scale on the basis of which the importance of different values of the success indicators can be evaluated? Only if we were able to answer both questions in the affirmative would it be possible to present the economist's case with regard to the choice between economic systems. In other words, we have to devise a possibility

1. By values we mean higher or lower levels of any success indicator, some of which are quantitatively measurable (for example, the growth of national income); some of these, on the other hand, are not measurable quantitatively (for example, static or dynamic efficiency)—for them only ordinal ranking can be used.

function for various economic systems, indicating the maximum achievable values of any success indicator given the values of the other variables; and a social welfare function, to indicate the society's preferences for the various indicators. That system would be judged superior the possibility function of which is tangent to a higher social welfare function.

3. The Success Indicators.

Static efficiency. Static efficiency (efficiency in resource allocation) is defined here by the requirement that there should be no possibility of increasing the output of one commodity without reducing the output of another, production conforming to the preferences of the community.[1] The preferences of the community may mean the consumers' or the planners' preferences[2] with regard to the final bill of goods.

An efficient solution presupposes the use of scarcity prices in production and allocation. If the planners' preferences are the guiding rule, prices are still scarcity prices, but now they reflect scarcities in regard to the final bill of goods determined by the central authority rather than by the consumers. In other words, the concepts of scarcity and efficiency are relative concepts: resources are scarce and allocation is efficient in regard to alternative final uses. In all these cases, the price system expresses the alternative cost of producing one commodity instead of another—on the basis of the consumers' or the planners' valuation—and the use of scarcity prices ensures the choice of least-cost production methods. With regard to static efficiency, then, the real difference is not between a free enterprise and a socialist system but between, on the one hand, free enterprise and price planning,[3] and, on the other, physical planning.[4]

Barone pointed out that the free market mechanism could be replaced by a centralized solution if the planning authority possessed all the

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1. Efficiency as here defined corresponds to the concept of productive efficiency used by Koopmans (Three Essays, p. 84).

2. The "planners' preferences" are conceived as the outcome of the planning process consisting of three steps: (1) determination of the primary targets of the economy, such as the maximization of the growth rate or the increase of military potential; (2) making of long run investment decisions to implement the primary targets; (3) determination of the final bill of goods (investment and consumer goods) for a given period (e.g. a year), given decisions under (1) and (2).

3. By price planning, a system of planning is meant that employs scarcity prices in making decisions on production and allocation.

4. Physical planning dispenses with the use of the price mechanism and allocates resources in physical terms. This method of planning is used in Soviet-type economies.

relevant information on consumers' demand functions,[1] resource holders' supply functions and producers' transformation functions. In this case, instead of the automatic solution on the market, this equation system is solved by the planning board. On the basis of this solution, the planning board allocates resources among firms and industries and makes the production and price decisions.[2]

From the analytical point of view, the workings of a purely competitive system and one of price planning are essentially the same. Nevertheless, certain differences in the two models will cause the amount of final goods to differ if resources are assumed to be identical.

There are certain economies of information in pure competition.[3] The individual producer needs to know only his production function, the prices of factors he uses and of commodities he produces. Contrariwise, the central authority needs the information available to all producers, consumers and resource holders, and needs to know also the preferences of consumers and resource holders. The collection and processing of data is costly in terms of resources since factors of production such as labor and machines are withdrawn from productive uses. This cost can be regarded as a reduction from the quantity of final commodities available. The time problem should also be mentioned here. Consumers' preferences, technological coefficients in production and resource holders' decisions to supply their resources are changing continuously. In the case of centralized decision-making, the collecting and processing of data takes time and the solution may considerably lag behind the actual situation. Furthermore, these changes requiring the recalculation of the equilibrium solution impose additional costs on the economy.

In addition, in pure competition his material interest induces the entrepreneur to maximize profits, and profit maximization leads to an

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1. Barone assumed the retention of consumer sovereignty. In view of the above discussion, production may also conform to the preferences of the planners instead of those of the consumers. In the latter case the planning authorities may distribute the predetermined quantity of consumer goods by outright rationing or by devising appropriate consumer prices to equate the fixed supply of consumer goods with the consumers' demand for them.

2. The producer prices of final goods are determined at the point where the quantity supplied at that particular price equals the quantity decided upon by the planning board. The determination of the quantities of final commodities may be made dependent on relative costs; in such a case we can visualize the planners' demand functions as being price-elastic. For some commodities the determination of the quantities produced may be made with no regard to costs; now the demand functions of the planners can be said to be price-inelastic.

3. See F. A. Hayek, "Economics of Knowledge," Economica, IV (February 1937), and Koopmans, Three Essays, pp. 22-23.

efficient position. Lack of incentives to play the game of profit maximization may constitute an obstacle to efficient resource allocation in the centralized form of price planning where the central authority mechanically equates marginal cost to price in every production unit. Here inertia and indolence may well impede the reaching of an efficient solution.

On the other hand, market failures[1] which impair efficiency in pure competition may be avoided in a centralized solution. Two types of market failures may be distinguished: those existing also if perfect information and foresight prevail, and those connected with imperfect information and uncertain expectations. Increasing returns to scale, external effects, and collective goods belong to the first category,[2] uncertainty and inconsistency of expectations, inertia and resistance to change, and imperfect information to the second.

The described model of price planning assumes that every commodity can be produced in a great number of ways with small changes in factor combinations as relative prices change, and it presupposes the measurability of marginal costs. The mathematical complexity of the model can be simplified if a linear programming model is applied. Here it is not assumed that marginal costs are necessarily known quantitatively. Substitution between factors, products, and factor-product combinations is carried out through shifts from one alternative process to another, where the number of processes is limited. A deficiency of this model is that it assumes constant returns to scale for each alternative process. Nevertheless, from the viewpoint of practical application, its better manageability makes the linear programming model superior to the Barone model.

Exploring the applicability of the linear programming model to planning, T. C. Koopmans has arrived at the conclusion that the decentralization of decision-making will further simplify the task of directing the economy.[3] Under the decentralization of production decisions as envisaged by Koopmans, prices are calculated by the planning board and firm managers have the task of expanding productive processes yielding a profit and contracting those leading to a deficit, thereby bidding up or lowering the prices of factors. If the planners were to decide to decentralize the process of decision-making in production, the mathematically derived prices would be theoretically the same as the trial and error prices of the socialist market solution.

It can be argued that a further simplification can be introduced in

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1. To use the convenient expression coined by F. M. Bator in "The Anatomy of Market Failure," Quarterly Journal of Economics, LXXII (August 1958), pp. 351-388.

2. It should be noted that Bator subsumes all factors belonging to the first type of market failure under the heading "externalities."

3. "Efficient Allocation of Resources," Econometrica, XIX (October 1951), pp. 455-465.

the model of price planning if for a considerable number of goods the formation of prices is left to the market consisting of socialist firms. This alternative has already been mentioned above.

If the linear programming type of price planning is used, the difference between price planning and physical planning can be expressed as follows: Whereas in the former model a number of activities (in the conventional diagrammatic presentation, "rays") are considered in the production of each commodity, the latter disregards all but one of these activities (rays). In a system of physical planning scarcity prices are not used in the allocation process; production requirements are estimated on the assumption of constant technological coefficients. The planning authority is assumed to proceed from above, devising a hypothetical final bill of goods and calculating resource needs for their manufacturing on the basis of constant coefficients in production. Such an estimate will show shortages and surpluses in various resources and intermediate goods. Consequently, the original hypothetical bill of goods and/or the production methods considered have to be adjusted to avoid discrepancies.

In adjusting the planned targets, the feasibility of these targets is checked by the use of so-called economic balances.[1]

In this equilibrating process a certain ranking of objectives, given by the planners' preferences, is observed; high priority targets are given advantage over those of lower priority. As for the determination of the final bill of goods, the priority scale of the planners is a substitute for the planners' "demand functions" in price planning. The priority scale, however, is a blunt instrument. No use being made of scarcity prices, there is no rational structure of relative costs in physical planning, but relative costs should be given consideration in making a choice among final commodities. Since various needs can be satisfied by several goods, cost ratios should be relied upon in determining the relative outputs of substitute products. Moreover, the ranking of needs in their varying degrees of satisfaction may also be dependent on relative costs. Accordingly, in the absence of a rational cost structure, rule of thumb decisions will assume importance which may entail inefficient choices among final goods.

Shortages and surpluses in various resources may also induce changes in production methods. If, for instance, there is a shortage in lumber, the use of lumber may be prohibited or restricted for certain construction or manufacturing activities. Nevertheless, such changes in production methods serve only as an imperfect substitute for scarcity prices, since it is impossible to consider all possible alternatives of resource use in physical terms. For instance, the repercussions of the partial substitution of concrete for lumber on the scarcities of resources cannot be traced through all sectors affected without the use of prices.

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1. "Physical balances," comparing availabilities and requirements in factors and products in quantity terms; and "synthetic balances," to ensure consistency between aggregates expressed in value terms (such as the national income balance).

There is one hypothetical case when price planning and physical planning would give the same result. This is the situation where there is only one possible way of producing intermediate products and final goods, and the demand functions of the planners are inelastic for every commodity. In this case, the technological coefficients being constant and the final bill of goods determined in advance, we have only to calculate the quantity of intermediate products and resources needed for producing the final commodities (and to modify the desired final bill of goods if resource availabilities require it). Disregarding substitution possibilities between factors of production and between intermediate products, the calculation of the resource and intermediate goods requirement follows as a matter of course. But substitution possibilities cannot be neglected as soon as we admit the existence of more than one scarce factor. Furthermore, as has been shown above, rational choice among commodities requires the consideration of relative costs. Thus, even if constant technological coefficients were assumed, price planning appears to be superior to physical planning since in the latter the absence of scarcity prices obstructs rational choice among alternative end products.

Physical planning, then, proves to be inefficient for two reasons: (a) resource allocation in physical terms does not make possible the choice of least-cost production methods; (b) the lack of a rational cost structure interferes with the rational determination of the final bill of goods. These results show the inferiority of physical planning to both pure competition and price planning so far as static efficiency is concerned.

It can be objected, however, that physical planning has an advantage over price planning, since less information is needed for the former than for the latter. Physical planning operates with constant technological coefficients, hence there is no need for information on alternative production methods. On the other hand, even if a linear programming method were used in price planning, information would be needed for some alternative processes in production. Consequently, the cost of information would be higher in the latter case. Yet it seems that if all the information needed for price planning were collected and processed, the cost of additional information on alternative production methods would be overcompensated by the savings realized, because an efficient solution would be reached instead of an inefficient one. Moreover, on this point price planning has an advantage over physical planning. As has been argued above, the cost of information can be reduced in price planning without impairing efficiency if production decisions are decentralized. On the other hand, in the case of decentralization in physical planning, although the heavy load of bureaucracy can be alleviated to a certain extent, the allocation of resources will become even less rational, since, because of an increase in the number of independent decision-makers, the compatibility of production targets cannot be insured either. J. Marczewski rightly observes that "the absence of a rational price system ... obstructs an effective decentralization of decision-making."[1]

1. Planification et croissance économique des démocraties populaires

Although an efficient allocation of resources cannot be achieved in physical planning, full resource use can be attained in this system. This objective can also be reached in price planning. On the other hand, uncertainty and inconsistency of expectations will bring about fluctuations in the employment of resources in pure competition. In other words, a purely competitive economy will work at least part of the time with less than full utilization of existing resources. Consequently, full employment of resources appears as an advantage of a socialist system with respect to static efficiency.

One final remark is in order. In our discussion the hypothetical conditions of pure competition have been considered disregarding monopolistic elements which impair the static efficiency achievable in the blueprint of pure competition. Similarly, possible deviations of actual socialist systems from the theoretical blueprints have also been left out of account.

Dynamic Efficiency. Static efficiency has been defined as efficient resource allocation at a given point of time; an economic system may exhibit static efficiency even if production is unchanged from year to year. Dynamic efficiency, as understood here, is concerned with the growth possibilities of an economy. Dynamic efficiency can be indicated by the hypothetical growth rates of national income achievable in different economic systems under identical resource use[1] and savings ratio[2]. Whereas static efficiency means that an economy operates on its production possibility frontier, dynamic efficiency can be represented by the movement of this frontier in a northeast direction.

There is only one case when static and dynamic efficiency coincide: the conditions for both are simultaneously fulfilled in a purely competitive economy under the assumption of constant returns to scale, no external effects, no lumpiness in investment, absence of technological change, and the knowledge of current rates of price changes on the side of the atomistic producers.[3] Relaxing these assumptions, the determinateness of our results disappears. Higher static efficiency, then, may be accompanied by a lower degree of dynamic efficiency, and vice versa. Efficiency in resource allocation is advantageous to dynamic efficiency since the fund of accumulation is greater; it may, however, also interfere with dynamic

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(Paris, Presses Universitaires, 1956), Vol. II, p. 519.

1. The term "identical resource use" is employed here as a shorthand expression for identical initial resources and the use of identical amounts of human labor.

2. Similarly to static efficiency, we do not require that production should conform to individual preferences; it may well correspond to the preferences of the planners.

3. See R. Dorfman, P. A. Samuelson, and R. M. Solow, Linear Programming and Economic Analysis (New York, McGraw-Hill, 1958), ch. 12.

efficiency if atomistic competition is not favorable to technological change. Schumpeter rightly stated: "A system—any system, economic or other—that at every point of time fully utilizes its possibilities to the best advantage may yet in the long run be inferior to a system that does so at no given point of time, because the latter's failure to do so may be a condition for the level or speed of long-run performance."[1]

There is much disagreement on the question whether a free enterprise or a socialist economy is superior with regard to dynamic efficiency. According to Hayek, a higher growth rate could be secured in a free enterprice system "if we assumed that the same restriction of consumption, which has actually taken place [in the Soviet Union], had been caused by taxation, the proceeds of which had been lent to competitive industry for investment purposes."[2] The contrary conclusion is reached, for example, by Dobb[3] and Sweezy.[4] Bergson also inclines to the latter view: "One may imagine that in a highly dynamic economy a Centralist allocation of investment might lead to fewer and smaller errors than a Competitive allocation."[5] Although Bergson's remarks were addresses to the competitive (market) solution in a socialist economy, they may apply to free enterprise as well.

It is posited here that if two economic systems exhibit the same degree of static efficiency, their dynamic efficiency will depend primarily on the prevalence of technological progress, consistency of investment decisions, and dynamic external effects in each system. Consequently, in assessing dynamic efficiency under various institutional arrangements, these factors should be given consideration.

William Fellner has shown that the rate of technological progress will be the same under differing institutional arrangements, such as pure competition and monopoly, if perfect rationality and certainty (also with regard to future technological change) are assumed.[6] This result extends also over a planned economy if the rule of profit maximization is followed by the decision-makers. Introducing, however, the possibility of incorrect anticipations and problems of motivation, no definite conclusions can be reached.

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1. J. A. Schumpeter, Capitalism, Socialism, and Democracy (New York, Harper, 1942), p. 83. Italics in the original.

2. Collectivist Economic Planning, p. 205.

3. On Economic Theory and Socialism, pp. 41-54.

4. Socialism, ch. 11.

5. Bergson, "Socialist Economics," p. 443.

6. "The Influence of Market Structure on Technological Progress," in Readings in Industrial Organization and Public Policy (Homewood, Ill., Irwin, 1958), pp. 289-294.

It has often been claimed that a purely competitive system is conducive to technological change since both the endeavor to survive and the profit motive greatly contribute to the introduction of new production methods.[1] On the other hand, Schumpeter[2] and later Galbraith[3] argued that the atomistic firms of pure competition do not possess sufficient resources to conduct research and undertake substantial innovations, whereas large enterprises are able to take the risks associated with innovating activity. Recently H. H. Villard emphasized the relationship between bigness and research, and between research expenditures and technological change.[4] An empirical study concerning U. S. industry between 1899 and 1939 presents evidence on a positive correlation between the prevalence of large units in an industry and technological progress;[5] the findings of a British study, however, do not give support to this view.[6] If, in spite of the somewhat inconclusive empirical evidence, the Schumpeter-Galbraith proposition is accepted, monopolistic market structures in a free enterprise economy or centralized direction of investments in a socialist system may be correlated with a higher rate of technical progress. A free enterprise economy with large production units, then, could combine the advantages of the profit motive with disposal over considerable means to finance innovating activity. Yet Schumpeter emphasizes that in large production units technological progress becomes automatic, "innovation itself being reduced to routine."[7] If this is true, a usual objection against socialism, that salaried employees are not interested in technical progress, loses much of its force. Schumpeter, however, neglected the problem of motivation. Fellner appears to be right asserting that monopoly may block progress if in the monopolist firm motives other than profit maximization, such as the quest for a quiet life,

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1. For a recent reiteration of "the oldfashioned faith in competitive markets," see G. W. Nutter, "Monopoly, Bigness, and Progress," Journal of Political Economy, LXIV (December 1956), pp. 520-527.

2. Capitalism, Socialism, and Democracy, ch. 8.

3. J. K. Galbraith, American Capitalism, rev. ed. (Boston, Houghton Mifflin, 1956), pp. 83-89.

4. "Competition, Oligopoly, and Research," Journal of Political Economy, LXVI (December 1958), pp. 483-497.

5. Almarin Phillips, "Concentration, Scale, and Technological Change in Selected Manufacturing Industries 1899-1939," Journal of Industrial Economics, IV (June 1956), pp. 179-193.

6. C. F. Carter and B. R. Williams, Industry and Technical Progress (London, Oxford University Press, 1957), pp. 121, 126.

7. Capitalism, Socialism, and Democracy, p. 132.

prestige, etc., result in inertia in regard to innovating activity.[1] It is contended here that not bigness by itself, but rather competition among large production units, is conducive to rapid technological change[2].

Although the above conclusion seems to favor a free enterprise economy with oligopolistic market structures to a socialist system, the latter has the advantage of coordination of research activity. This consideration might have prompted the advocacy of government participation in research, particularly in basic research, by some economists[3]. It should be added that, although technological change may come about sooner in a free enterprise system than under socialism, technological progress can be smoother in a planned economy. Under free enterprise, where innovations are made by individual concerns, secrecy, patents, etc. may delay the spreading of new production methods. Similar problems may arise also in a system of market socialism.

Uncertainty and inconsistency of expectations in a free enterprise framework is frequently mentioned as a serious drag on dynamic efficiency.[4] Under free competition, decisions to increase capacity are made separately by each firm, and these plans are coordinated ex post facto only, through the market mechanism. The lack of information on investment decisions of other entrepreneurs and the uncertainty of expectations may lead to too much or too little investment in a particular field. It seems that the greater the dynamism of a free enterprise system, the higher is possible waste. On the other hand, the planning board can avoid overlapping and may organize and coordinate investment activity well in advance. Nevertheless, this argument is not so conclusive as it seems. Thinking in terms of waste, people are liable to forget that waste may be a necessary corollary to progress. The path of growth may be smoother in a socialist economy but a dynamic free enterprise system may achieve a higher rate of growth even at the expense of greater fluctuations. This is possible if the endeavor to survive and the profit motive overcompensate for the uncertainty and inconsistency of expectations. The gain due to the consistency of investment decisions in centralized planning might also be counterbalanced by losses due to bureaucratical mismanagement rooted in the absence of sufficient incentives.

Besides the consistency of investment decisions, a planned economy

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1. "The Influence of Market Structure on Technological Progress," p. 293. The argument can be extended to centralized planning, where bureaucracy in decision-making may impede technological progress.

2. Similar conclusions are reached in Villard's quoted article, p. 493.

3. Carter and Williams, Industry and Technical Progress, p. 174, and Villard, "Competition, Oligopoly, and Research," p. 495.

4. Tibor Scitovsky, Welfare and Competition (Homewood, Ill., Irwin, 1951), pp. 233-241.

has a further advantage over a free enterprise system because external economies can be taken into account in planning investment activity. External economies in a dynamic sense are of two kinds: the impact of social overhead on "productive" investments, and the interrelationships of the productive investments themselves. The first type of dynamic external effect has special importance for underdeveloped countries. Investments in transportation facilities or public utilities are frequently unprofitable for the private producer although "profitable" from the viewpoint of social productivity, since investments of this sort facilitate the establishment of industrial enterprises. Here centralized decision-making has clear advantages. Nevertheless, it can be argued that central planning should be restricted to the provision of social overhead only, and let private initiative do the rest. External effects between productive investments are supply or demand relationships; the establishment or development of an industry may be accompanied by investments in supplier industries or may facilitate the growth of user industries.[1] These externalities, however, may act as a driving force of development without central planning, through the profit motive.[2]

In an underdeveloped country as well as in a war economy, the central direction of investment activity may assume considerable importance. It can be claimed that a large-scale reapportionment of resources can be better served by centralized decision-making than by the market mechanism. In such a case even the physical allocation of some resources might be advantageous. Nevertheless, with the development of the economy the importance of marginal choices increases and structural changes assume less significance; hence decision-making in physical terms becomes increasingly unsatisfactory. In addition, physical allocation cannot be used in choosing among investment projects with identical end products.

On the basis of the above arguments no conclusive judgment can be formed on dynamic efficiency in various economic systems. Some factors seem to favor free enterprise, others a socialist economy.[3] It should be added that psychological and sociological factors and differences between the blueprints and their actual realization may also influence the outcome.

Growth Rate of National Income. Distinction should be made between the concepts of dynamic efficiency and actual growth rate.[4] Dynamic

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1. On this point see T. Scitovsky, "Two Concepts of External Economies," Journal of Political Economy, LXII (June 1954), pp. 143-151, and M. Fleming, "External Economies and Balanced Growth," Economic Journal, LXV (June 1955), pp. 241-256.

2. Cf. A. O. Hirschman, The Strategy of Economic Development (New Haven, Yale University Press, 1958), ch. 4.

3. With respect to a socialist economy, centralized decision-making appears to have some advantages over a decentralized solution.

4. Two difficulties should be mentioned here in regard to the estimation of

efficiency was defined as the hypothetical growth rate of national income achievable in different economic systems under identical resource use and savings ratio. The actual growth rate is affected not only by the dynamic efficiency of the system but also by the central authority's action overruling individual preferences in regard to saving versus spending and work versus leisure. Despite dynamic inefficiencies, an economic system may achieve a higher growth rate through an increase in the saving ratio or through an involuntary increase in the amount of work performed.[1]

Recently more and more emphasis has been placed on the growth rate. One has the impression that in the eyes of many people the rate of growth is the sole success indicator. Much of the recent writings on economic growth as well as a host of political speeches convey the same impression. The dissenting voices—like that of Galbraith, who contends that "our concern for production is traditional and irrational"[2]—are comparatively few. It is not our concern here to appraise the importance of the growth rate as a success indicator. We shall rather restrict the discussion to the examination of various factors which affect the rate of growth.

In a free enterprise economy, saving is determined by the preferences of the individuals and by corporate saving. In the case of a socialist economy, the central authorities decide what part of national income will be used for investment purposes. The possibility of enforcing a higher saving

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the growth rate, although no attempt will be made to analyze them. First, there is a conceptual problem: the definition of national income. Our results will be different depending on whether one uses, for example, the Soviet concept of national income, which is equivalent to the value of material production, or a Western concept, which includes services. Second, there is the problem of measurement: no unequivocal measure of the growth rate can be devised. Changes in the proportion of goods with decreasing costs, structural changes in production, new commodities and quality changes—all make the measurement of the growth rate and the comparison of growth rates in different countries in a considerable degree inconclusive. For an extensive treatment of the problem of measurement see F. W. Nutter, "On Measuring Economic Growth," Journal of Political Economy, LXV (February 1957), pp. 51-63. Also "Comment" by H. S. Levine, "Reply" by Nutter, and "Rejoinder" by Levine, in the same journal, LXVI (August 1958), pp. 352-363.

1. The objection that the saving ratio does not affect the equilibrium growth rate under conditions of constant returns to scale and in the absence of technological change has more theoretical than practical importance. See T. W. Swan, "Economic Growth and Capital Accumulation," Economic Record, XXXII (November 1956), pp. 334-342, and R. M. Solow, "A Contribution to the Theory of Economic Growth," Quarterly Journal of Economics, LXXI (February 1956), pp. 65-94.

2. The Affluent Society (Boston, Houghton Mifflin, 1958), p. 132.

ratio in a socialist state makes a higher rate of growth feasible. To quote Fellner: "A totalitarian government, if it could establish itself in a country such as the United States, might not find it difficult to operate the economy at a level of consumption 20 to 25 per cent lower than our present consumption level, and then let consumption rise slowly with the rise of aggregate output. By such a policy, the present American net capital formation could be more than doubled, and it is quite likely that the annual economic growth rate of the United States could be almost doubled."[1]

This disadvantage of a free enterprise system with regard to the proportion of national income invested can be offset by taxation, the proceeds of which could be lent to individuals for investment purposes, as envisaged by Hayek.[2] But would Hayek really advocate such a policy, would he plead for the encroachment upon the individual's freedom to consume or save at will? In view of his doctrine implying the undesirability of forced saving,[3] this is not very likely. But we should not forget that many representatives of "bourgeois" economics have regarded forced saving, brought about by wage increase lagging behind price rises, as a necessary condition for capitalist development.[4]

We should also deal here with a frequent misunderstanding according to which an enforced increase in saving constitutes a sacrifice on the part of the present generation, the beneficiaries of which will be our descendants only. This is not necessarily true. It can be shown that under certain assumptions the centrally determined increase in saving will lead to an increase in the well-being of the present generation not accounted for in the individual saver's decision. Savings, if invested, have a complementarity effect on wages which is not foreseen by the individual saver. Let us assume that there is sufficient technological change to counteract the fall of the interest rate which would result from an increase in the capital stock under unchanged technology. In such an event, the wage rate would rise (because of the increase in capital stock) with the interest rate unchanged. Consequently, as soon as the addition to the capital stock had been completed, the savers would enjoy an additional - and at the time of saving unexpected—benefit in the form of wage increases.[5] This complementarity

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1. Trends and Cycles in Economic Activity (New York, Henry Holt, 1956), p. 73. Italics in the original.

2. Collectivist Economic Planning, p. 205.

3. See his Prices and Production, London, Routledge and Kegan Paul, 1931.

4. For example, J. M. Keynes, A Treatise on Money (New York, 1930), Vol. 2, pp. 152-163.

5. In the absence of technological change, however, the unexpected gain in wages will be counterbalanced by an unanticipated loss due to the decline of the rate of interest as the stock of capital increases, if constant returns to

effect appears as an argument for interference with the amount of saving based on individual preferences.

It is another question if we assume that the amounts invested will be used less productively in a socialist economy. Such a situation may arise, for example, from bureaucratic mismanagement due to insufficient incentives. But even if this assumption were made, our problems would still not be solved. Let us assume the following hypothetical situation: in a socialist economy the saving ratio is 20 per cent, one-fourth of investment is "wasted" and the growth rate is 6 per cent. Now in a free enterprise economy let us postulate a saving ratio of 10 per cent, no waste in investment and a 4 per cent growth rate. How are we to decide the merits and demerits of these two hypothetical economies? We need some kind of a "preference scale" to evaluate them, and Hayek's preference scale will surely differ from Dobb's.

The central authority may also overrule individual preferences in regard to work and leisure. It can enforce an increase in the amount of work performed by forced labor, by an enforced extension of labor hours, and by indirect pressure through the reduction of real wages to raise the number of workers per family. Such practices lead to a higher growth rate at the expense of leisure.

Consumer Satisfaction. In the discussion of the three success indicators examined heretofore we have postulated that production should correspond to the preferences of the community, which may refer to individual preferences or to the preferences of the planners as well. In other words, in the evaluation of these indicators no distinction has been made between a system based on consumer sovereignty or on autocratic decisions. We have disregarded the problem of who decides the goals of the economy and it has been considered only how and whether these goals are attained. It can be said that our first three indicators are free from value judgments. By introducing consumer satisfaction as the fourth success indicator, we introduce the possibility of making value judgments in evaluating the performance of various economic systems. It should be noted, however, that the above duality of the success indicators can be further retained: although consumer satisfaction may serve as an indicator, the planners might assign zero value to it if they decide to disregard it completely. On the other hand, the introduction of this indicator makes it possible to differentiate between the performance of economic systems based on consumer sovereignty or on autocratic decisions. If two economic systems achieve the same degree of static and dynamic efficiency, and the same growth rate, the one based on consumer sovereignty will be judged as more desirable if consumer satisfaction is regarded as an objective. Three factors can be said to contribute to consumer satisfaction: (1) the correspondance of the production targets to individual preferences, (2) the correspondance of the actual saving ratio to the saving ratio based on the individuals' preferences, and (3) the correspondance of actual work performed to the individuals' preferences on work

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scale are assumed.

versus leisure.[1]

Consumer satisfaction in its lastly mentioned two forms can be regarded as a constraint to the growth rate. We have seen that, given the dynamic efficiency of an economy, the rate of growth can be increased only by overruling individual preferences with regard to saving versus spending and work versus leisure. Such a decision entails a diminution of consumer satisfaction. In other words, given dynamic efficiency, an increase in the growth rate of national income requires loss of satisfaction on the part of the individuals. In the von Neumann model[2] the maximization of the growth rate is reached if the population is being held on the subsistence level: the portion of national income above the amount necessary for subsistence is reinvested. In this paper we consider the direct or indirect pressure by the central authority to increase the amount of work performed as a further factor which raises the growth rate and reduces consumer satisfaction.

The level of consumer satisfaction reached can be indicated by the living standards of the population. In appraising the standard of living we have to take into account whether the goods produced are those desired by the individuals and have to consider leisure as an element in the standard of living. For a longer period, the temporal change in living standards should be considered. In this connection it should be noted that over a period sufficiently long that the results of investment activity can be reaped by the population, a high growth rate may raise future consumption. Yet this is not necessarily so: if, for example, the planners regard the increase of military capacity as their primary objective, a high growth rate may be accompanied by a permanent restriction of consumption.

Distribution of Income. Income redistribution does not affect efficiency if it can be carried out by lump-sum redistributions. Lump-sum redistribution, however, is not only impractical but in a dynamic economy even lump-sum measures have an impact on efficiency. Lump-sum taxes and subsidies altering the income distribution in one period affect the amount of work supplied and risk-taking in the succeeding periods, which in turn produces an effect on the dynamic efficiency of the economy.

Consequently, income distribution in its impact on effort and risk-taking has an effect on the other success indicators. It can rightly be assumed that if risk-taking and superior performance are not properly rewarded, the efficiency of the economic system will suffer. On the other hand, income distribution is not only one of the factors affecting the other success indicators, but a success indicator in itself. The distinguishing characteristic of this indicator is that we need to make a value judgment in determining what kind of income distribution is desirable and how different distributions are valued. A may prefer an equal distribution of income; B may give priority to distribution on the basis of marginal productivity; the

1. For qualifications see the next section.

2. J. von Neumann, "A Model of General Economic Equilibrium," Review of Economic Studies, XIII (No. 1, 1945-46), pp. 1-9.

problem of unearned incomes enters the picture; natural scarcities complicate the issue, etc.[1] The economist can hardly do more than state the fact that income distribution is one of the success indicators that influences the other variables in an economic system, and where the evaluation of the desirability of different income distributions cannot be made without invoking value judgments.

4. Whose Preferences?

We have now examined the five success indicators which would provide a way to measure the performance of different economic systems. Let us assume for the moment that the values and relationships of these variables for various economic systems are known. As has been seen, we then face the problem of devising some kind of a preference scale on the basis of which the values of the success indicators can be rated. The question arises, whose preferences should be relied upon? Two extreme cases may be mentioned: we may say that the decisions of the individuals should be considered, or we may rely on a paternalistic authority whose decisions overrule individual preferences.

The Case for and Against Consumer Sovereignty. Consumer sovereignty may mean two things: (a) consumers are free to choose between the commodities available, or (b) consumers are able to guide production decisions via their demand for consumption goods. The first alternative must be rejected since it is compatible with the determination of the quantities produced of various consumer goods by the planning authority; here the consumer market is only a rationing device to distribute the given amount of goods among consumers. On the other hand, the second alternative expresses the idea that consumer decisions should regulate the allocation of resources among alternative uses.

If we unqualifiedly accept consumer sovereignty as the guiding rule, there is no problem in evaluating the various success indicators since a free enterprise economy with no government intervention would result in such values of these variables which correspond to the individuals' wishes. But are consumers' preferences a reliable guide? Consumer sovereignty has been exalted by many exponents of free enterprise as a measure of freedom. Nevertheless, free consumers' choice can be insured in a socialist economy as well; the proponents of the market solution also favor this alternative and reject the authoritative decision-making of the planning board with regard to consumer goods.[2]

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1. For conflicting interpretations of the concept "just distribution" see T. J. B. Hoff, Economic Calculation in the Socialist Society (London, Hedge, 1949), pp. 34 ff.

2. Cf. Lerner, "Economic Theory and Socialist Economy," Review of Economic Studies, XI (October 1934), pp. 53-54, and Lange, "On the Economic Theory of Socialism," pp. 93-98. Note that these authors do not accept consumer sovereignty with regard to saving decisions, and repudiate

The doctrine of consumer sovereignty is based on two assumptions. First, it is maintained that it is morally right that the consumer decide what should be produced and what portion of the national income should be saved, and the consumer's decision is realized on the market by "voting," where money serves as a "ballot"; second, it is assumed that consumer demand is independent of production and there is no interaction in consumption. The following qualifications are intended to show the inadequacies in these assumptions and the limitations of the doctrine of consumer sovereignty.[1]

a. It has been pointed out by many that the existing distribution of wealth and income cannot be regarded as desirable. The "ballots" in the possession of the individuals are only partly the result of one's own productive activity. In Knut Wicksell's words: "There is one inequality from which we can never abstract, without making a serious mistake, namely social differences and the unequal distribution of property."[2] If this is so, state intervention is needed to change the quantity of "ballots" in the hands of some individuals.

b. Against the assumption that consumer wants are independent of production, the social determination of individual tastes and wants has been argued. It has been pointed out that "individual tastes and wants are socially conditioned by advertising and custom so that they can hardly be said to belong to him in any ultimate sense."[3] Galbraith uses the analogy of the squirrel wheel: the squirrel (production) moves upward but the wheel turns, that is, individuals acquire new tastes to consume the newly produced goods.[4]

Consumption being, in part, socially determined (either by advertising or by the consumption of others), it cannot be said that consumer demand is an independent factor; one can even argue that state intervention may be needed to correct socially conditioned consumer wants.

c. Collective consumption presents similar problems. It has been emphasized recently that a considerable part of national income is spent on goods which are not consumed individually but by the society. Education, road construction, defense, and internal security are the most conspicuous examples. The market mechanism cannot be used to determine

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property income claims.

1. Market imperfections on the production side have already been mentioned in connection with static efficiency.

2. Lectures on Political Economy (London, Routledge, 1934), Vol. 1, p. 77.

3. P. A. Samuelson, Foundations of Economic Analysis (Cambridge, Harvard University Press, 1955), p. 224.

4. The Affluent Society, p. 156.

the quantity of goods collectively consumed.[1] Galbraith remarks that there is a tendency in the present day United States to belittle the importance of collective consumption which is partly due to the conditioning of demand for private goods by advertising.[2] The need for a proper balance between private and collective goods has been forcefully emphasized by James Tobin: "Government dollars spent for such things as fire and police protection, education, postal service, highways, parks, hospitals, libraries, sanitation and flood control, need have no inferiority complex with respect to private dollars spent for steaks, television, freezers, alcohol, horse racing, gasoline, comic books, and golf."[3]

The need for collective consumption arises from indivisibilities; another form of interpersonal relations appears in the external effects in consumption. One person's consumption may increase the satisfaction of another person (an increase in the telephone network is a good example), or may reduce someone else's well-being (for example, by boisterous behavior due to excessive drinking).

d. Another qualification is related to the problem of time horizon. In forming their plans individuals consider time periods of differing lengths for which plans are made. Future satisfactions may be not our own and in our saving decisions we may disregard the interests of our descendants. The implications of the clash of individual decisions on the time horizon, saving and investment have been explored by Jan Graaf, who maintains that "these are not decisions which households, acting separately, are equipped to make. There is no satisfactory 'competitive' solution... Politics—or paternalism—is involved."[4]

e. A. C. Pigou contends that the preference for present goods does not imply that the utility of present consumption is greater than the utility of future consumption. In his opinion mankind's "telescopic faculty" is perverted in the sense that, apart from the fact that we do not attach sufficient importance to the welfare of future generations, we are unable to size up our future satisfactions from future goods. In Pigou's words: "the aggregate amount of economic satisfaction which people in fact enjoy is much less than it would be if their telescopic faculty were not perverted, but equal (certain) satisfactions were desired with equal intensity whatever

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1. For a solution based on individual preferences see P. A. Samuelson, "Public Expenditure: A Diagrammatic Exposition," Review of Economics and Statistics, XXXVII (November 1955), pp. 350-356.

2. The Affluent Society, ch. 18.

3. "The Eisenhower Economy and National Security: Two Views. I. Defense and Doctrine," Yale Review, XLVII (Spring 1958), p. 329.

4. Theoretical Welfare Economics (Cambridge, University Press, 1957), p. 105.

the period at which they are destined to emerge."[1] Consequently Pigou advocates state intervention in saving, since "economic welfare could be increased by some rightly chosen degree of differentiation in favour of saving."[2] The idea of man's telescopic faculty crops up also in the writings of some socialist authors, for example in the works of M. Dobb.[3] Reference should also be made to the previously mentioned complementarity effect which is independent from the underestimation of future satisfactions.

f. Another argument is that we are inconsiderately using up coal and other scarce natural resources, hence state intervention is needed to preserve the resources in question. This argument certainly has importance, for example, in the case of forests. In some other cases it appears to be somewhat overrated: Jevons' fears about the exhaustion of coal reserves have not been realized, because of the substitution of other sources of energy for coal.

On the basis of the arguments displayed here the conclusion can be reached that consumer sovereignty in its unqualified form cannot serve as a guiding rule in evaluating different economic systems. We turn now to its very opposite: the paternalistic solution.

The Paternalistic Solution. The unconditional acceptance of consumer sovereignty lurks behind the advocacy of complete freedom from state intervention. At the other extreme, it has been asserted that the planning authority knows the individuals' and the community's needs better than the individuals themselves. The central authority appears, in these views, as omniscient and omnipotent. A candid statement made in the History of the Communist Party of the Soviet Union can be quoted as an example: "The power of the Marxist-Leninist theory lies in the fact that it enables the party to find the orientation in any situation, to understand the inner connection of current events, to foresee their course and to perceive not only how and in what direction they are developing in the present, but how and in what direction they are bound to develop in the future."[4]

If this is so, why do we need individual preferences? Can't we leave everything to be determined by the infallible authority—the Party? Some Western socialists adhering to the centralist solution put the matter more mildly, calling authoritarian decision-making "a diet prescribed by a doctor to a patient."[5] On the other hand, for those who rightly reject

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1. The Economics of Welfare (London, Macmillan, 1932), p. 26.

2. Ibid., p. 29. Italics in the original.

3. Political Economy and Capitalism, p. 309.

4. New York, International Publishers (1939), p. 355. This book was officially ascribed to Stalin and until recently regarded as one of the "holy books" in the Communist orbit.

5. Dobb, Political Economy and Capitalism, pp. 307-314.

totalitarian schemes and the idea of an infallible central authority, assistance is furnished also by the proponents of the socialist market solution. Lange writes, on the abrogation of consumer sovereignty: "Mr. Lerner has sufficiently shown the undemocratic character of such a system and its incompatibility with the ideals of the socialist movement. Such a system would scarcely be tolerated by any civilized people."[1]

A Compromise? In this section we have attempted to find criteria on the basis of which the relative importance of our success indicators could be evaluated and the merits and demerits of different economic systems judged. We have seen that this evaluation can be made either by unconditionally accepting consumer sovereignty or by letting a central authority decide the issues. In the first case the free market would automatically supply the answer; in the second, a central authority would make the decision. It has also been shown that these extreme cases do not stand thorough criticism. A proposal may be advanced according to which we should, in some form or other, rank and weigh individual preferences in regard to the success indicators. A may think that efficient resource allocation is the measure of success for an economic system, B may give priority to the growth rate, C may favor an equal distribution of income. Is it possible to strike an average of the supposedly widely differing opinions? Can we construct a preference scale for the whole community based on individual preferences with regard to the various success indicators for an appraisal of our blueprints of economic systems? In the author's opinion, the answer is in the negative. It would require a "superman" to compare and rank the preferences of individuals as to the relative evaluation of the success criteria. Consequently, there is no way to postulate an appropriate scale of values that would supply a ranking of the success indicators and thereby the evaluation of the performance of economic systems.

5. In Conclusion.

The conclusion can now be reached that economic arguments are not sufficient to make a choice between the blueprints of economic systems. Two reasons have been established: we cannot determine the performance of the various blueprints with regard to the success indicators, and we are unable to construct a scale of preferences which would give the ranking of different values of the success criteria. Moreover, even if the relative merits and demerits of the blueprints of various economic systems could be judged, their actual realization will show considerable deviations from the theoretical construction. Besides, as a result of sociological and psychological factors, a free enterprise or a socialist blueprint may work better in one and worse in another country.

Not only do non-economic factors influence the workings of an economic system, but non-economic objectives may also modify any result reached by the use of our success indicators. The planners may set targets

1. "On the Economic Theory of Socialism," p. 95, also pp. 93-98. Lerner, "Economic Theory and Socialist Economy," pp. 51-61.

that are in no way connected with the economic performance of a system. Political objectives may exclude, for example, the use of efficiency prices if the central authorities do not want to disseminate information on the relative valuation of military and consumer goods. Furthermore, the objective of centralization of decision-making for fear of sabotage or lack of competence on the lower echelons may hinder the decentralization of production decisions. Or, a dictator may be interested exclusively in increasing his power and might disregard economic considerations. In the latter cases, non-economic success indicators would appear on the scene. Nevertheless, we do not include these indicators in our model since they are not amenable to evaluation with the use of economic tools.

Our conclusion on the possibility of evaluating blueprints of various economic systems by the use of a set of success indicators has been a negative one. Nevertheless, these success criteria prove to be useful in appraising the performance of real world economies. In the examination of any economy, two questions should be raised: How does the actual working of the economy differ from the blueprint? How does the economy under consideration "score" in terms of our success indicators? I have attempted to answer these questions in regard to the Hungarian economy for the period beginning with the launching of the Five Year Plan and ending with the Hungarian Revolution (1950-1956). The results of this inquiry are presented in my study on the Hungarian experience in economic planning.

A TEST FOR THE PRESENCE OF COST INFLATION IN THE UNITED STATES 1955-57*

Edmund S. Phelps

Many economists maintain that labor unions in this country recently have exerted increasing pressure upon wage costs and prices, and that between 1955 and 1957 this pressure resulted in a wage push or cost inflation. In this essay empirical methods are proposed and applied in an effort to determine whether there was any more wage push during the 1955-57 inflation than in the earlier postwar inflations.

I. The Meaning of Cost Inflation and the Wage-Push Question

Before the empirical analysis is considered, the differences, as we see them, between traditional demand-pull inflation and wage-push inflation will be examined. These questions of definition are interesting in their own right, and with some definitions in hand the scope of this study can be more clearly set forth.

A. Operational Definitions

The cost inflation hypotheses and the demand inflation hypothesis are meaningful alternatives only if they carry different implications for the behavior of the economy, under hypothetical conditions if not in practice. What difference does it make for the rate of growth, unemployment, and other variables of economic significance if we have a 4 per cent rate of cost inflation or a 4 per cent rate of demand inflation? What impact does the type of inflation experienced have upon the effects of fiscal, monetary, commercial and antitrust policies, any of which might be employed to combat inflation or achieve other important goals? If the answers to both these questions were that it made no difference, then the hypotheses would not be substantive alternatives. We could fairly say, in this eventuality, that every inflation in history has been a "demand inflation" or a "cost inflation," whichever term we prefer.

To demonstrate that any proposition is potentially refutable, and thus operationally meaningful, requires the adoption of some model or theory from which it may be deduced how the world would differ were the proposition true. Our models of cost inflation and demand inflation are developed in the conventional Keynesian framework and their behavior implications (on which basis the models are operationally distinguished) presuppose the usual short-run, comparative-statical Keynesian theory.

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* The author is grateful to Professors William J. Fellner, Mark W. Leiserson, Arthur M. Okun, and James Tobin of Yale University for their counsel and encouragement in the preparation of the dissertation on which this essay is based.

The object is merely to formalize, without changing its substantive content, the literature advancing these hypotheses.

Keynesian theory, except in special circumstances and even then only on restrictive conditions, logically requires the assumption that the economy produces but one commodity with homogeneous labor the only variable input. In the analysis below, these assumptions are made initially and subsequently relaxed, whereupon the discussion becomes more informal. However, the discussion is nowhere intended to be really rigorous. Keynesian (or neo-Keynesian) theory, let alone the relevant existence and stability theorems, is taken almost completely for granted.

1. Comparative-statical, single-commodity models.

Figure 1 summarizes the features of the analytical framework on which the following analysis depends. The price level, P, and the rate of output, Y, are jointly determined by the aggregate demand schedule, DD, and the aggregate supply schedule, SS.

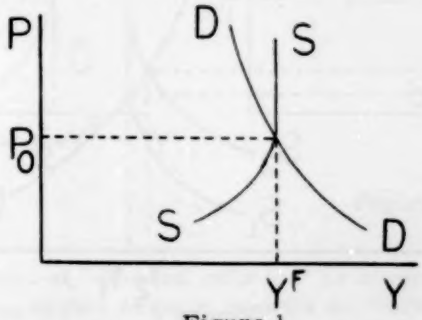

Figure 1

DD is negatively sloped for the following reasons: The bond rate of interest will be higher and the real value of cash balances lower, the higher the price level, given the existing stock of money and bonds. The higher the interest rate, the lower investment demand (the Keynes effect); and the lower real cash balances, the smaller consumption demand (the Pigou effect).

The SS curve is drawn on the assumptions of pure competition, diminishing returns to labor, and "money illusion" on the part of labor at rates of employment corresponding to output rates smaller than Y^F. For any given level of employment corresponding to an output rate smaller than Y^F, an increase in the price level will produce a proportionally smaller increase in the asking money wage rate (nominal "supply price" of labor) at the given employment level. Hence, at output rates smaller than Y^F, the higher the price level, the lower the real wage rate and, thus, the higher the level of employment and output. But it is assumed that there is some rate of output, Y^F, to which there corresponds an employment level at which there is no money illusion. At that rate of employment (or any higher rate), any increase in the price level will produce an equiproportional

increase in the asking wage rate. Hence, at the rate of output Y^F, an increase in aggregate demand will raise prices and the wage rate in the same proportion; the real wage rate will be unchanged and the equilibrium rate of output supplied will thus remain the same.

We shall refer to Y^F, the maximum equilibrium rate of output, as the "full employment rate of output."

A single dose of wage push can be represented, in a purely competitive model, by an upward shift in the labor supply curve (plotted against the money wage rate). In general, there is a family of such labor supply curves, one for each price level (cost of living). If this family of curves shifts upwards uniformly, then the SS schedule will shift upward in the manner depicted in Figure 2. The DD schedule is, of course, independent of the SS schedule so that, ceteris paribus, the rise in prices will cause a contraction of output and employment. It is clear that the price level must rise even in the absence of an upward shift of the aggregate demand schedule.

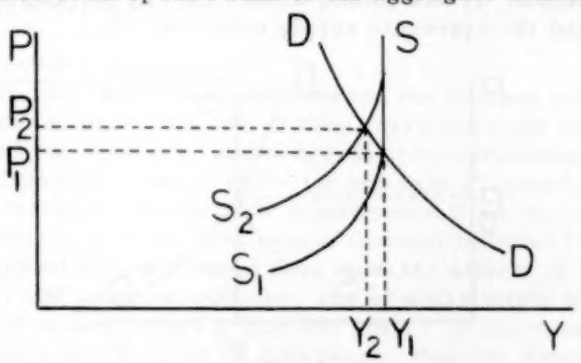

Figure 2

Given the DD schedule, how many doses of wage push should we expect? That is, how far will prices rise and output contract? The wage push adherents answer rests on suppositions concerning the wage and employment policies of labor unions which, in their view, are responsible for cost inflation. Union management, it is assumed, balances the disadvantages of unemployment among the union membership against the benefits of annual wage gains for those members with jobs. The union will exert wage push only if employment (unemployment) exceeds (equals or falls short of) some critical level. Let us call the output rate which (from the production function) corresponds to that employment level the "wage-push threshold output," Y^T. The answer to the question posed, therefore, is that prices will rise until output has contracted to the level Y^T.

Cost-push theorists emphasize, however, that current public policy commits the monetary and fiscal authorities to maintain output, as best they can, at the full employment level. With output and employment stabilized at a level in excess of the wage-push threshold, labor unions are free to direct their full bargaining power toward the achievement of annual wage gains. Monetary or fiscal measures are applied to "ratify" each dose of

wage push, thus setting the stage for another round of what becomes a perpetual inflationary process.

Figure 3a records the equilibria before and after cost inflation occurring at the rate of output Y^F. We may suppose, without loss of generality in what follows, that the inflation is ratified by the monetary authorities. To this end they need merely, in this model, vary the money supply in proportion to the price level so as to inactivate the Keynes and Pigou effects.

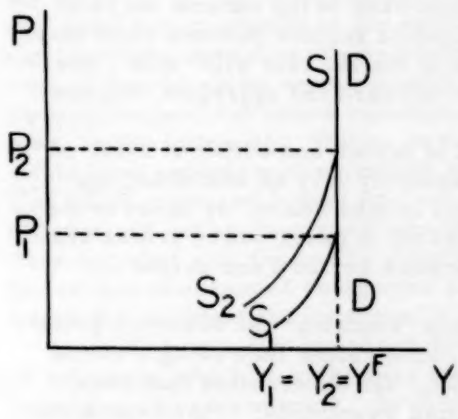

Figure 3a

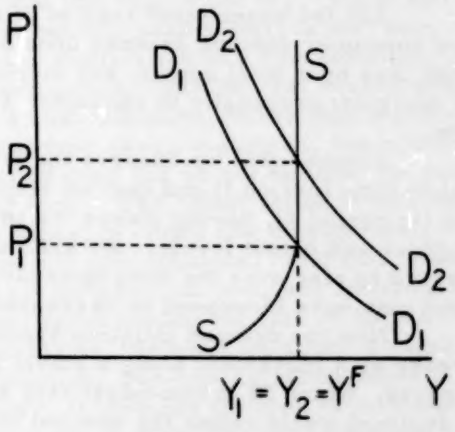

Figure 3b

The usual model of "demand inflation" is diagrammed in Figure 3b. The increase in aggregate demand creates an "inflationary gap" which is a measure of the amount of excess demand at full employment output. Since an equilibrium rate of output higher than Y^F is impossible, prices will increase until their increase induces a decline in aggregate demand (at Y^F) equal to the initial gap. Among the factors which can produce such a demand inflation are an increase in the money supply, an increase in the demand for bonds, a balanced budget increase in government expenditure, an increase in the government deficit, an autonomous increase in investment demand and an autonomous increase in consumption demand.

A comparison of Figures 3a and 3b shows that there is no necessary difference to be observed between the behavior of output and prices (and, implicitly, employment and wage rates) in a cost inflation and the behavior of those variables in a demand inflation. There may, of course, be differences between a particular cost inflation and a particular demand inflation. But an operational distinction between these two kinds of inflation which is perfectly general must consider the two important cases of Figure 3.

The question thus arises as to whether there really is any necessary differences between cost inflation and demand inflation. The only treatment of this problem with which the present author is acquainted is contained in a paper by Professor William Fellner entitled "Demand

Inflation, Cost Inflation, and Collective Bargaining."[1] Professor Fellner would differentiate between the two kinds of inflation from observations made during a hypothetical experiment in which some orthodox monetary or fiscal measure is taken to curb the rate of inflation. The following discussion takes this approach and owes much to this paper. The situations in which we contemplate performance of the experiment differ, however, in some respects from those considered by Professor Fellner, so he may not agree with the conclusions expressed below.

Let the experiment consist of an increase in the income tax rate. Since consumer demand depends upon disposable income (income after taxes) rather than upon total output, any increase in the tax rate will, with a positive marginal propensity to consume, shift leftward the aggregate demand curve.

Suppose that we observe the level of prices and output at some point in time (period 1) and that we simultaneously levy an additional tax. Then (in period 2), having waited for the tax to take effect, we observe the new price and output levels. We are interested in cases where prices are observed to rise over the time interval (between period 1 and period 2). Output may have increased or decreased.

Now the demand inflation hypothesis "explains" the observed price increase as a movement along a stable SS curve rather than along a stable DD curve. Since SS is non-negatively sloped, the observation that output had declined would refute the demand inflation hypothesis. This hypothesis is potentially refutable, therefore, because it contains the testable implication that there exists some tax rate increase which will permit prices to rise without curtailing the rate of output.

The cost inflation hypothesis explains the observed price increase as a movement along the DD curve (which is possibly vertical) rather than along SS. This hypothesis implies that there exists no tax increase which, while permitting prices to rise, does not curtail the rate of output (between period 1 and period 2). If these are the experimental results, then the observed inflation is a cost inflation.

Are mixtures of demand inflation and cost inflation possible? Suppose a tax increase can be levied which is small enough to permit a price increase but which is not so large as to curtail the rate of output. It can be inferred only that DD has shifted so that at least part of the observed price increase was a demand inflation. Some of the price rise may be attributable to a shift of the SS curve. For suppose that our experimenters proceeded to find the maximum tax which they could impose, subject to the constraint that output not decline, and yet prices continued to rise. This residual inflation is cost inflation since, after the (constrained) maximum tax has been imposed, there then exists no further increase in the tax rate which, while still permitting a rise in the price level to be observed, will not curtail the rate of output.

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1. Phillip D. Bradley, ed., The Public Stake in Union Power, University of Virginia Press, 1959.

Suppose, on the other hand, that initially there exists no increase in the tax rate which will not reduce the rate of output. Then, clearly, there is not "some increase ..." so that there is no demand inflation present on our criterion. Yet the DD curve may have shifted upward in this situation so that, at first, this property of the criterion (viz., that it disregards the possible shift of DD) may seem arbitrary and biased. Actually it is not. In the experimental situation considered, DD could have shifted upward, had no tax increase been imposed, at most by the amount of the upward shift in the SS curve (at the initial output rate) and this fact is the key. First of all, from the standpoint of the cost-push model, such a shift is just like, and therefore operationally equivalent to, ratification of a cost inflation, even if the two shifts were causally unconnected. But the real reason why we must regard the entire inflation as a cost inflation, rather than a mixture, is the following: While, in the extreme case considered, the economy would have experienced a demand inflation even had SS not shifted, the inflation which occurred in fact was not that kind. The actual inflation was one which could not be dampened except at a cost to output and employment. This is, after all, the policy significance of cost inflation. And that is why the criterion advanced designates as cost inflation, in toto, any inflation in which the slightest tax increase imposed must curtail the rate of output.

The criterion proposed designates as "demand inflation" a class of inflations which is wider than the classical, gap-type inflation which occurs at full employment. In particular, it includes the kind of inflation which accompanies an expansion of aggregate output. We may call this kind of inflation "demand expansion." Also, the criterion designates as "cost inflation" a variety of inflations which operate from the supply side, some of which should be distinguished from wage-push inflation. The import of these considerations, however, is better discussed in a broader analytical context.

2. Multi-commodity, multi-labor models and dynamics.

The aggregative models of the previous section neglect the facts that modern economies contain markets for more than one type of labor, even within a single industry, and that they contain more than one industry. These characteristics of modern economies result in two kinds of unemployment.

One kind of unemployment is "frictional unemployment." Workers newly entering the labor force require time to find their preferred employments. Experienced workers can be expected to transfer, on occasion, from one firm, locality or occupation to another in response to changes (favorable or adverse) in their employment opportunities and changes in their preferences for these opportunities. These transfers are not "frictionless" or instantaneous because it takes time to accumulate information and finance—in short, because of imperfect labor "mobility."

Paradoxically, the existence of frictional unemployment in the economy does not necessarily prevent—in fact it may facilitate—the attainment of full employment, as defined above. Frictional unemployment may be inelastic with respect to the price level. It may be no larger at low

levels of aggregate demand than at high levels of demand. If so, then the greater frictional unemployment, given the size of the labor force, the sooner any demand expansion will bring output up to its maximum equilibrium level.

The second kind of unemployment excluded from the aggregative models is "structural unemployment." Structural unemployment is unemployment which is specific to workers who have particular skills, or who are customarily employed to produce particular goods, for which market demand is slack. There are normally a few industries where demand is slack, even when aggregate demand is high and there is no unemployment elsewhere. Workers in these depressed industries may not immediately wish (due, say, to optimism) or be able (due to imperfect mobility) to find work in other industries where there is no unemployment. Even in an individual industry, there may be excess supplies of particular labor inputs if there are bottlenecks in other cooperating inputs.

Structural unemployment, in contrast to frictional unemployment, clearly is a function—in particular, a decreasing function—of aggregate demand. The higher the level of demand, the smaller the pockets of unemployment, in respect both to average size and number. But structural unemployment is probably not a rapidly decreasing function of aggregate demand, for sales in the fully employed industries may well double or triple before unemployment is completely eradicated in the laggard industries. For that reason, we may expect that, even if aggregate employment is quite high, a demand inflation may produce an expansion of output (i.e., demand expansion).

Yet, if zero structural unemployment is rare, it does not follow that full employment (the maximum equilibrium level of aggregate employment) is rare. A demand expansion may fail to eradicate structural unemployment and yet cause "overfull" employment.

Yesterday's demand expansion might eliminate yesterday's structural unemployment, but today will bring a new structure of demand, creating fresh excess supplies of labor (as well as excess demands) to be eliminated. Unless the wage rate and employment adjustments are instantaneous, structural unemployment will reappear. How can each day's structural unemployment be forestalled except by a continuous increase in aggregate demand and all wage rates? It cannot. The maximum equilibrium employment level (steady index of wage rates) must be one where there is always some structural unemployment. Zero structural unemployment would entail a continuous disequilibrium, or "overfull" employment.

This can be proved as follows: A reasonable condition for overall wage stability is that, summing over the individual labor submarkets, the sum of the weighted gross excess supplies of labor equal the sum of the weighted gross excess demands for labor, where the weights measure the downward or upward flexibility of wage rates in the submarkets. Suppose that stability (equilibrium) were compatible with zero structural unemployment. This would imply that all gross excess supplies and all gross excess demands were zero. And the latter would imply that, barring instantaneous wage rate

adjustments, the structure of commodity demands would never alter (except in perfect harmony with changes in production possibilities). But surely the structure of demand is continuously changing. Excess demands can be expected to arise. Hence, stability of overall wages requires that excess supplies be positive also, i.e., that there be some structural unemployment.

We have argued that most demand inflations contain an element of demand expansion. There are two cases of demand expansion to be distinguished: that in which output expands short of the full employment level of output, and that in which the full employment level of output is surpassed. The distinction is important, for the two cases have different implications for the meaning of "cost inflation."

Consider first the case of a demand expansion in which employment remains less than "full" throughout the expansion. For expositional convenience, we revert to the aggregative model. Suppose that the increase in aggregate demand causes employment and output temporarily to exceed their new equilibrium levels. This might happen in the aggregative model if today's supply of labor depends upon today's wage rate but upon yesterday's cost of living (price level). The consequent timepath of aggregate output and the price level is shown in Figure 4.

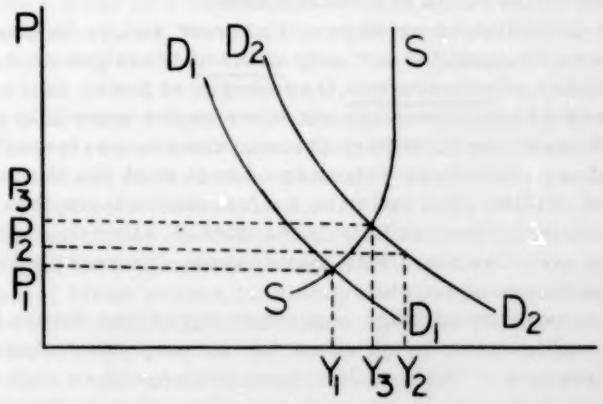

Figure 4

Between period 1 and period 2, output would increase from Y_1 to Y_2 and prices from P_1 to P_2. But when workers realized, in period 3, that prices had risen, so that their real earnings were pro tanto smaller, they would cut back, in period 3, the amount of labor they would be willing to supply at period 2's money wage rate. Prices and wages would be driven up, and output and employment would contract (given DD's negative slope) until the final P_3-Y_3 equilibrium were attained.

What if our hypothetical experimenters had conducted their tests in period 2? They would have found it impossible to levy an additional tax which, while small enough to permit some inflation (from base P_2), would not have contracted

output (below Y_2). They would designate the observed inflation to be a cost inflation.

The criterion would evidently be inadequate in this situation of wage lags. The kind of inflation that we wish to distinguish from demand inflation is the sort which creates a conflict between the maintenance of full employment and long-run price stability. The type of induced cost push described (Figure 4) does not threaten long-run, permanent inflation; for, even if output is stabilized (ratified) at the level Y_2, prices will cease to rise once the economy "gets back" on its aggregate supply curve. The policy choice posed by this transient, induced cost push is merely between the current rate of output at the cost of a higher but steady price level and the current price level at the cost of a lower (but steady) rate of output. This is a classical choice which, since the advent of public policy in these matters, has always been taken in favor of employment.

Our definition of cost inflation may be revised, so as to exclude that kind of cost push which is both induced and transient, as follows: If there is no increase in the tax rate which does not curtail output, and if stabilization of the current rate of output permits a persistent, lasting inflation to be observed, then that inflation is cost inflation in the strict sense. We may regard the rate of inflation observed in this experiment as an operational measure of the "rate of cost inflation."

This definition is perhaps too narrow since, in a situation of underfull employment, it excludes not only induced transient cost push, but also excludes varieties of autonomous transient cost push: an increase in the monopoly power of producers, an increase in the monopoly power of unions, a once-for-all increase in import prices, and a once-for-all change in the scarcity of labor. But these varieties of cost push (in the loose sense) are all short-lived, unlike cost inflation as just defined, so that the policy significance attaching to them differs, presumably, from the significance of cost inflation in the strict sense. For that reason, the restrictiveness of our definition is perhaps appropriate.

The possibility of wage lags when aggregate demand is sufficient or more than sufficient to bring about full employment raises a problem of a different character. The problem does not appear to call for still another definition of cost inflation, but is instead substantive in that it raises some questions as to what economists advancing the wage-push hypothesis have really meant.

Suppose that a demand inflation occurred, output being initially at the full employment rate, Y^F in Figure 3b above. Y^F is the maximum equilibrium rate of output so that the increase in aggregate demand cannot result in a higher equilibrium rate of output. But the increase in aggregate demand may produce a higher disequilibrium rate of output, temporarily, if there are wage lags of the sort suggested above. Suppose that these lags exist so that, while output must eventually subside to the equilibrium level Y^F (barring an interminable succession of demand inflations), output is for the moment at a disequilibrium level in excess of Y^F. There is "overfull" employment.

What is the adjustment mechanism whereby output, employment,

prices and wage rates are re-equilibrated? It is a wage-push mechanism in every observable respect. Once labor begins to "catch up," wage rates and prices will be driven up; employment and output will contract as a consequence of the Keynes and Pigou effects. To verify this, we may call in our experimenters. During the first stage of the inflation, in which output expanded, they will designate the price increase a demand expansion. But in the second stage, they will find it impossible to levy an additional tax which, while permitting prices to rise, will not curtail the rate of output; and they will find that stabilization of the current rate of output (the disequilibrium rate) permits a persistent, lasting inflation. They will announce the presence of cost inflation. In any operational sense, the inflation observed in the second stage is wage-push inflation.

Far from being a surprising result, it is in complete accord with the theory of cost-push inflation expounded above. According to cost-push theorists, cost inflation arises when the rate of output exceeds some critical level. Whether we call this critical level the "wage-push threshold, Y^T," or "the full employment rate of output, Y^F," makes no difference. Those concepts have the same operational meaning, viz., the maximum equilibrium rate of output or, in other words, the maximum output consistent with price stability.

It follows from this analysis that cost inflation is only as new, in U. S. economic history, as "overfull" employment. Conceivably, cost inflation, far from being the "new inflation," is a phenomenon almost as old as money. But this is not to say that all, or even most, demand inflations do produce overfull employment. On the contrary, overfull employment may be uncharacteristic of past peacetime inflations. Even when overfull employment is attained toward the tail-end of the boom, the boom may typically be interrupted by recession too soon for cost push to be felt. Whether or not cost inflation is new in this country is an empirical question.

If the presence of cost inflation cannot be said, a priori, to depend on the existence of labor unions or monopolies, it is also true that either institution can contribute to cost inflation. If the economy were initially at the cost-push threshold, and subsequently there were a change in the power or policies of either unions or monopolies—or for that matter, if there were an increase in the scarcity of labor—the cost-push threshold would contract. Maintenance of output and employment at levels near the old threshold would lead to cost inflation, i.e., a permanent upward spiral of prices. There is no need to postulate the irrational union or the crazy monopolist. The notions of a static optimum and of disequilibrium suffice to "explain" cost inflation, although such a theory of cost inflation may not be the right one. Clearly, a cost inflation (in the strict sense) may be a wage-push or a profit-push inflation; it may be "union-induced" or "monopoly-induced" or merely transmitted by these institutions; or it may be some inextricable combination of these things.

What is the position of those economists advancing the wage push argument and, somewhat distinct from this, what are the hypotheses which our empirical analysis is suited to test?

B. The Wage Push Question and the Scope of this Investigation

On our interpretation, the wage-push position consists of the following propositions: The cost-push employment threshold has recently contracted to normal, prosperity levels of employment (in relation to the size of the labor force); and for any given level of employment (relative to the labor force) at which cost push would have resulted in earlier times, there would lately have been more cost push. Due to its greater proximity to prosperity levels of employment, the cost-push threshold was crossed for the first time early in the 1955-57 boom (or perhaps a few years earlier), thus producing an historically new kind of inflation, cost inflation. This heightened propensity to cost inflation is attributable to the evolving powers and policies of labor unions in this country. To these propositions is usually added the prediction that in the future the price of otherwise desirably high employment is creeping (cost) inflation.

The motivation of the present study is to evaluate this position. But our investigation is no more than a step in that direction.

It is evidently impossible to determine whether cost inflation is literally a brand new phenomenon in U. S. economic history. Nevertheless, the postwar period provides one, and perhaps a second, example of an inflation which conforms well enough to the model of pure demand inflation (in particular, demand expansion) to serve as a yardstick against which to compare the characteristics of the latest, allegedly cost push inflation. The approach is comparative. We try to answer the question: Was there a higher rate of cost inflation (in per cent per unit time) in the latest inflation than in the earlier postwar inflations?

A second question of equal if not greater importance is: Was the cost-push threshold smaller in relation to the size of the labor force during 1955-57 than in the earlier postwar inflations? I.e., had employment levels been equal in all three postwar inflations, would there have been more cost inflation in 1955-57 than in the earlier inflations? Since employment relative to the labor force was in fact about the same in all three postwar inflations (particularly in the nonagricultural sector), a test of the first proposition (more cost push) is effectively a test also of the second proposition (smaller cost-push threshold).

These are the two hypotheses which this study seeks to test. The limitations of this investigation are therefore clear, but one of these limitations should be emphasized. From the tests presented no inferences can be drawn concerning the role of labor unions in the 1955-57 inflation. The test performed in the final section of this essay, wherein lies the chief contribution of our study, offers no grounds for choosing among various theories of cost push (e.g., monopolies, unions)—or even for choosing among the various types of cost push (wage push, profit push, etc.). However, the distributive shares data examined in the following section do provide some basis for choosing wage push over profit push if indeed there was cost push during 1955-57.

The next section examines the aggregative data on which the wage-push hypothesis is based. The merits and shortcomings of this evidence are noted. The succeeding section advances a different type of test for

cost push, one which employs less aggregated data. The results of that test and the conclusion to be drawn from this study are contained in the final section.

II. The Aggregative Evidence against the Demand Pull Interpretation of the 1955-57 Inflation

Since World War II there have been, to date, three inflations: that occurring during 1946-48, that occurring between 1950 and 1952, and that during 1955-57. We will refer to these inflations as Inflation I, II, and III respectively.

Inflation I is widely regarded as a demand inflation pure and simple. In the words of Walter Morton, "It is now generally agreed that the immediate postwar inflation must be classified as a demand inflation, although, at the time, some erroneously interpreted it as...a version of cost push."[1]

Inflation II is also largely attributed to demand pull. But there is some controversy as to whether the mild rise in prices between 1951 and 1952 was not due in part to wage push. It is sometimes maintained that wage push was present throughout the period 1951-53 and that inflation was averted only by virtue of a sharp decline in the prices of farm output.

Unlike the earlier inflations, Inflation III was not conspicuously a demand inflation in that there was no evidence of excess liquidity, speculative buying, growing federal deficits, and what not. Yet, between July 1955 and August 1957 wholesale prices rose about 7 per cent and between October 1955 and November 1957 retail consumer prices rose some 6 per cent.

A. The Comparative Behavior of Distributive Shares

One of the cornerstones of the case against the traditional, demand-pull interpretation of the latest postwar inflation is the behavior of distributive shares during 1955-57. The underlying argument is this: In a (pure) demand inflation, profits can be expected at least to hold their own against the wage bill; if wage rates lag behind prices (due to the infrequency of wage negotiations), then profits will increase relatively to the total wage bill and national income.

The first postwar inflation appears to be a classic demand inflation on this criterion. Total corporate profits before taxes rose and the wage bill fell, in relation to national income, steadily between 1946 and 1948. (See Table 1.)

Inflation II conforms less well to these expectations. Profits increased remarkably between 1949 and 1950, while prices increased about 1.5 per cent. The level of profits as a ratio of national income was at the postwar peak during 1950 and 1951. But during 1951 and 1952 wages gained on profits (chiefly at the expense of property and rental incomes). Between 1951 and 1952 profits declined in absolute terms as well as in relation to

1. W. A. Morton, "The Role of Labor in Postwar Inflation," Monthly Labor Review, 82 (February 1959), p. 131.

Table 1

National Income by Distributive Shares
(in billions of dollars)

Year	National Income (1)	Employee Compensation (2)	Corporate Profits Before Taxes (3)	(2) ÷ (1) (4)	(3) ÷ (1) (5)
1946	180.9	117.7	17.3	65.1%	9.6%
1947	198.2	128.7	23.6	64.9	11.9
1948	223.5	141.1	30.8	63.1	13.8
1949	217.7	140.8	28.2	64.7	13.0
1950	241.9	154.2	35.7	63.7	14.8
1951	279.3	180.3	41.0	64.6	14.7
1952	292.2	195.0	37.7	66.7	12.9
1953	305.6	208.8	37.3	68.3	12.2
1954	301.8	207.6	33.7	68.8	11.2
1955	330.2	223.9	43.1	67.8	13.1
1956	349.4	241.8	42.9	69.2	12.3
1957	364.0	254.6	41.9	69.9	11.5
1957[a]	364.8	254.6	42.9	69.8	11.8

a. First, second, and third quarters total, at annual rates, seasonally adjusted.

Source: U. S. Department of Commerce, Survey of Current Business, July 1958.

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national income.

Inflation III looks quite unlike demand inflation on this basis. Profits bounded in 1955 to their best levels, in relation to national income, since 1951. But prices were virtually stable between 1954 and 1955. The period of marked inflation (the last half of 1955 through 1957) was associated with a steady decline—absolute and relative to the aggregate wage bill—of total corporate profits.

These data do not, however, prove the existence of cost inflation in 1956 and 1957. The level of corporate profits is subject to a number of influences (even in the short run) which are extraneous to the wage-push issue. Variations in the composition or structure of demand, for example, will generally affect distributive shares. An increase in the demand for commodities which are comparatively labor-intensive (e.g., many services and light manufactures) can raise wages and lower profits, given total resources. Also changes in demand favoring products in the noncorporate sector will naturally reduce corporate profits, given real aggregate demand. In general, any increase in the transfer prices of resources (raw materials, labor) used in the corporate sector can be expected to reduce corporate

profits. That a portion of Inflation III was cost inflation is plausible, therefore, but not certain.

B. The Comparative Behavior of the Rate of Growth

Adherents of the wage-push interpretation of Inflation III argue that, unless an abnormally low wage-push threshold is assumed, the 1955-57 expansion was too small to account for the accompanying rate of inflation.

Column 2 of Table 2 shows that the annual percentage increases in Real Gross National Product during 1955-57 were, on the average, less than the rates of growth achieved during the earlier two inflations. Between 1955 and 1956 output rose only 2.4 per cent and between 1956 and 1957 output rose only 1.2 per cent. These rates are less than half the growth rates achieved during the Korean inflation, and smaller, on the average, than those experienced between 1946 and 1948.

Table 2

Values and Percentage Annual Growth of Real Gross National Product and Real Farm and Nonfarm Gross Product (in billions of 1954 dollars)

Year	GNP (1)	Percentage Increase (2)	Farm GNP (3)	Nonfarm GNP (4)	Percentage Increase (5)
1946	282.5	--	18.4	264.1	--
1947	282.3	-0.1%	16.9	265.4	0.5%
1948	293.1	3.8	19.3	273.8	3.2
1949	292.7	-0.1	18.3	274.4	0.2
1950	318.1	8.7	19.3	298.8	8.9
1951	341.8	7.5	18.1	323.7	8.3
1952	353.5	3.4	18.8	334.7	3.4
1953	369.0	4.4	19.5	349.5	4.2
1954	363.1	-1.6	20.3	342.8	-1.9
1955	392.7	8.2	21.4	371.3	8.3
1956	402.2	2.4	21.5	380.7	2.5
1957	407.0	1.2	20.8	386.2	1.4

Source: U. S. Department of Commerce, Survey of Current Business, July and September 1958.

It may be preferable to look at annual growth rates between the "years" beginning the fourth quarter since Inflation III began in late 1955. The two growth rates beginning October 1954 are 4.2 per cent and 1.7 per

cent.[1] These compare favorably with the growth rates achieved in Inflation I.

In contrasting the growth rates in Inflation III against those in Inflation I, allowance should be made for the disparate growth of Real Farm G.N.P. In Inflation I, farm output rose (about 4.0 per cent); during Inflation III, Real Farm G.N.P. declined (about 3.0 per cent). Presumably this decline in farm output had little or nothing to do with union-generated wage push, which, if it occurred, would have originated in and had its principal impact upon the output of the nonfarm sector. Looking at Column 4 of Table 2, we find that the biennial growth rate of nonfarm real G.N.P. between 1946 and 1948 was slightly less than 3.7 per cent; the biennial growth rate between 1955 and 1957 was slightly better than 4.0 per cent. The nonfarm expansion during Inflation III was actually stronger than during Inflation I.

But it is interesting that the expansion slowed noticeably between 1956 and 1957, a space of time during which prices were increasing most rapidly, and even accelerating. As Column 5, Table 4 shows, this pattern is not characteristic of Inflation I nor of Inflation II (in which output slowed but so did prices). It suggests that output and employment may have backed away in an encounter with the wage-push threshold. But this is only a possibility. The retardation in growth may have been due largely to an autonomous slackening of demand in particular sectors in which there was little downward price flexibility, especially in the latter half of 1957. Or the rate of growth of productivity may have slackened in 1957.

Finally, the labor market may have grown very tight during 1957. This may or may not have led to "overfull" employment and cost inflation. But in either case it would not support the contention that labor unions had moved the wage-push threshold closer to normal, prosperity levels of employment. In reply, subscribers to the wage-push hypothesis introduce their third ground.

C. The Comparative Behavior of Unemployment Ratios

For cost-push adherents, the clinching evidence is the fact that unemployment in the economy as a whole, and in manufacturing especially, exceeded its average, postwar prosperity level throughout Inflation III. Unemployment as a proportion of the civilian labor force was greater during 1955-57 than in any other inflationary year with the exception of 1946 and 1950 (into which the 1949 recession extended a few months).

However, the difference between the degree of unemployment during the months of actual inflation between 1955-57 and those between 1946-48 are smaller than the annual data lead one to believe. Table 3 shows that

1. Real G.N.P. for the twelve months beginning October 1954 was $416.8 billion (in 1957 dollars); beginning October 1955, $434.3 billion; and beginning October 1956, $441.8. See Table 3, Survey of Current Business, December 1958. Similar adjustments of the growth rates in Inflation I and II might be appropriate, but the data extend back only to the first quarter, 1950.

Table 3

Unemployment as a Proportion of the Civilian Labor Force, 1947-48, 1955-57
(Seasonally Adjusted)

	Old Definition[a]				
	1947	1948	1955	1956	1957
January	3.7	3.1	4.5	3.7	3.8
February	3.4	3.5	4.5	3.7	3.6
March	3.5	3.6	4.4	3.8	3.5
April	3.7	3.4	4.4	3.7	3.6
May	3.6	3.2	4.0	3.9	3.9
June	3.8	3.2	3.8	3.9	4.2
July	3.8	3.2	3.6	4.1	3.8
August	3.6	3.3	3.8	3.7	3.9
September	3.5	3.4	3.8	3.6	4.0
October	3.5	3.3	4.0	3.6	4.2
November	3.3	3.5	3.8	3.8	4.8
December	3.3	3.7	3.7	3.7	4.8
Annual Average	3.6	3.4	4.0	3.8	4.0
	New Definition[b]				
January	3.9	3.6	4.9	4.0	4.2
February	3.7	3.9	4.8	4.1	4.1
March	3.8	3.9	4.7	4.3	3.9
April	4.1	3.8	4.8	4.1	4.0
May	4.0	3.6	4.3	4.4	4.1
June	4.1	3.7	4.1	4.4	4.2
July	4.2	3.6	4.1	4.4	4.2
August	4.1	3.8	4.3	4.1	4.3
September	4.0	3.8	4.2	4.0	4.5
October	3.9	3.7	4.4	4.0	4.7
November	3.6	4.0	4.2	4.2	4.9
December	3.6	4.2	4.1	4.1	5.0
Annual Average	3.9	3.8	4.4	4.2	4.3

a. Persons laid off or waiting to start new jobs are included among the employed in these estimates.

b. Persons laid off or waiting to start work are included among the unemployed.

Source: U. S. Department of Commerce, Survey of Current Business (forthcoming issue).

the unemployment ratios for the twelve-month period beginning September 1956—the period in which prices, especially wholesale prices, rose most rapidly—are barely higher than those existing during 1947 and 1948. The labor market as a whole appears to have been especially tight during the early spring of 1957.

Were the disparity in unemployment ratios larger than we have found, one would still hesitate to conclude that labor unions had pushed back the wage-push threshold. The degree of aggregate unemployment is never a sure indicator of the degree of inflationary pressure in the labor market, quite apart from union wage policies. As was suggested in Chapter 1, unemployment is a measure of the total gross excess supplies of labor in the individual submarkets for labor; but the average wage level can rise, despite these excess supplies, if the sum of the gross weighted excess demands exceeds the sum of the gross weighted excess supplies, the weights being estimates of the wage flexibilities (upward or downward, respectively) of the individual labor submarkets. The aggregated data reveal nothing about the excess demands. If it can be assumed that the gross excess demands were about as large in 1955-57 as in 1946-48, then, since the gross excess supplies were only a little larger, Inflation III is not so surprising. For if the excess of gross excess demands over gross excess supplies was smaller during Inflation III than Inflation I, it should be emphasized that Inflation III was smaller too!

More stock could be put in the aggregative data if it could be shown that greater than average unemployment was fairly general in the economy during the 1955-57 inflation. Table 4 contains data which indicate very roughly the degree of unemployment in the economy by major sectors. Unfortunately, these data do not extend backward past 1948. The 1948 data are likely to understate the degree of unemployment present in many if not most sectors during Inflation I as a whole since unemployment was considerably smaller in 1948 than in 1946 and 1947. Quarterly data for the first three quarters of 1957 were also unavailable.

Table 4 shows that overall relative unemployment during 1955-57 was high, as compared to the degree of overall unemployment in the earlier postwar inflations, principally because of the comparatively high degree of unemployment in the agricultural sector during Inflation III. But advocates of the wage-push hypothesis hold labor unions responsible for Inflation III, and the unions are concentrated in the nonagricultural sectors of the economy. To establish their case from unemployment data, they must show that nonagricultural unemployment was abnormally large.

Apparently nonagricultural unemployment was not abnormally large during Inflation III. Between the third quarter of 1955 and the third quarter of 1957 (inclusive) about 3.8 per cent of experienced nonagricultural wage and salary workers were unemployed, on the average; this compares with 3.7 per cent during 1948 (and presumably a higher figure in the two previous years) and about 3.8 per cent (performing a little interpolation) during Inflation II.

Nonagricultural unemployment was likewise unevenly distributed among the constituent subsectors during 1955-57. Unemployment in the

services, wholesale and retail trades, "transportation, communication and public utilities" and public administration sectors was lower in Inflation III than Inflation I. Unemployment was larger during the latest postwar inflation in manufacturing and construction.

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Some of the evidence presented above suggests that if Inflation III were a pure demand inflation, it was at least an unusual one. But it is possible to fit, ex post, a demand-pull model to the 1955-57 data. We need merely assume that demand "pulled" most strongly, especially toward the latter half of the inflation, in the nonfarm, nonmanufacturing sectors of the economy; and that demand fell off in manufacturing and construction enough to reduce corporate profits.

In general, commodity demands are always changing in differential magnitudes in the different industries comprising the economy. Inflationary periods are no exception. The microeconomic characteristics of each demand inflation are unique and for that reason one cannot draw conclusive inferences from aggregative evidence.

The same is true of cost inflation. If the hypothesis is that labor unions have pushed up wage rates, then, since labor unions are not to be found everywhere in the economy, we would expect that costs in some sectors were pushed up more strongly than in others.[1] It is conceivable but not proved here that if wage push were concentrated against a single sector, aggregate profits could rise in relation to the total wage bill.

It is desirable, therefore, to plug the holes of the aggregative approach with a less aggregative approach. Fortunately, such a complementary approach seems possible. The microeconomic characteristics of cost push in an economy in which costs, if they are being pushed up, are likely to be pushed up more in some sectors than in others, can be utilized to detect the presence of that cost push. The following section develops this approach.

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1. According to 1954 estimates of the Bureau of Labor Statistics, only 25 per cent of the labor force and only 35 per cent of nonagricultural workers belonged to unions. [See Paul Sultan, Labor Economics (New York, Henry Holt and Company, 1957), p. 123.] 1947 data developed by Leo Wolman show that nearly 50 per cent of those belonging to unions at that time worked in manufacturing. Wolman also found that 42 per cent of wage and salary workers in manufacturing were organized, that 64 per cent of those in transportation, communication and public utilities were organized, that 75 per cent of those in construction were organized, and that 84 per cent of those in mining were organized. The proportions for other industries were quite low, less than 10 per cent. [See Leo Wolman, "Concentration of Union Membership" in A Half-Century of Union Membership (National Bureau of Economic Research, 1952), p. 216.]

Table 4

Unemployment Ratios by Industry Group and Type of Worker

	Total Experienced Labor Force	Agricultural Labor Force	Nonagricultural	Wage and Salary Nonagricultural	Construction	Manufacturing
1948	3.1	1.3	3.4	3.7	7.6	3.3
1949	5.1	1.8	5.6	6.2	11.9	7.2
1950	4.9			5.5	10.7	5.6
1951	2.8			3.2	6.0	3.3
1952	--			2.9	5.5	2.8
1953	2.3	1.3	2.5	2.6	6.1	2.5
1954	4.7	2.2	5.0	5.4	10.5	6.1
1955	3.7	1.9	3.9	4.2	9.2	4.2
1Q.	5.0	3.2	5.2	5.6	15.1	5.7
2Q.	3.8	1.4	4.0	4.4	8.6	4.3
3Q.	2.9	1.5	3.1	3.4	5.7	3.3
4Q.	3.1	2.0	3.3	3.5	7.8	3.4
1956	3.4	2.0	3.5	3.8	8.3	4.2
1Q.	4.1	3.4	4.2	4.5	13.7	4.4
2Q.	3.4	1.3	3.6	4.0	7.4	4.8
3Q.	2.9	1.3	3.1	3.4	5.2	4.0
4Q.	3.1	2.3	3.2	3.4	7.4	3.4
1957	3.5	2.0	3.7	4.0	9.1	4.4
4Q.	3.8	2.2	3.9	4.3	9.3	5.2

(Table 4 continued)

	Mfg. Durables	Mfg. Nondurables	Transportation, Communication and other Public Utilities	Wholesale and Retail Trade	Services	Public Administration	Self-employed and Unpaid Family Workers
1948	3.4	3.6	3.0	4.3	3.2	2.0	1.0
1949	7.4	6.9	5.2	5.8	4.6	2.9	1.6
1950	5.2	6.0	4.1	5.8	4.5	2.8	1.8
1951	2.6	4.0	1.9	3.7	2.8	1.6	1.1
1952	2.4	3.3	1.9	3.1	2.4	1.1	--
1953	2.0	3.1	1.8	3.0	2.2	1.2	0.8
1954	6.5	5.7	4.8	5.2	3.7	2.0	1.4
1955	4.0	4.4	3.5	4.3	3.5	1.8	1.1
1Q.	5.4	6.0	5.5	5.6	3.6	2.5	1.2
2Q.	4.3	4.5	3.9	4.4	3.7	1.7	1.3
3Q.	3.4	3.2	2.2	3.6	3.4	1.5	0.8
4Q.	2.9	4.1	2.5	3.7	3.2	1.4	1.2
1956	4.0	4.4	2.4	4.1	2.9	1.6	0.9
1Q.	4.2	4.7	2.8	4.9	3.0	2.4	1.4
2Q.	4.7	5.0	2.2	4.1	3.0	1.2	0.7
3Q.	4.0	4.1	2.5	3.6	2.8	1.4	0.6
4Q.	3.0	3.9	2.2	3.8	2.8	1.5	1.0
1957	4.3	4.5	2.8	4.2	2.9	1.8	1.0
4Q.	5.7	4.5	3.2	3.9	2.9	1.6	1.1

Source: U. S. Bureau of the Census. Current Population Reports: The Labor Force, Series P-50.

III. A Microeconomic Test for Cost Push

The statistical test proposed in this chapter starts from the following simple idea: If the direct impact of union-generated wage push were confined to some subset of the various sectors in the economy as a whole (because labor is elsewhere unorganized or their unions week), then, ceteris paribus, there should occur a comparative rise in the prices of the products produced in the unionized sectors and a comparative decline in the rate of output in those sectors. Justification of the test depends upon certain other propositions concerning the behavior of relative prices and output rates, so we will turn our attention first to these.

Relative prices and outputs fluctuate for a number of reasons. The principal factors affecting them are the structure of demand, the structure of labor supplies (through which wage push enters), and the technology. We will consider the response of the price and output patterns in the economy to changes in each of these factors in that order.

The analysis is comparative-statical. The product and labor markets are assumed to be purely competitive. Attention is confined to the short run, in which homogeneous labor is assumed to be the only variable input.

A. Differential Changes in Demand

We wish to know how the pattern of prices and outputs alters when commodity demands change in differential magnitudes. Consider, first, a two-commodity world of, say, manufactures and services.

Suppose that there is an autonomous increase in the demand for services. We will assume that there is full employment in both industries; that is, there is no "money illusion" in either labor market.[1]

At the initial rates of output and employment in the two industries, the "supply price" of manufacturing labor (which, given the money wage rate, is proportional to the price level for any given rate of employment) will rise more than the "demand price" for manufactures (unless manufactures and services are perfect substitutes or perfect complements). Assuming that the labor supply curves in both industries are positively inclined with respect to the real wage rates, respectively, this will cause manufacturers to reduce output and employment in relation to output and employment in the service sector. At the same time, the price of manufactures will decline in relation to the (higher) price of services.

Hence, differential changes in commodity demands produce, ceteris paribus, a positive correlation between price changes and output changes in the two industries. Price and output in the service sector both rose more than average.

Consider now the three-commodity case. While this case is much more complicated, it is still possible to derive reasonable conditions on

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1. Thus, an equiproportionate increase in both money wage rates and the general price level will produce no change in the supply of labor to either industry.

which differential changes in demand will produce positively correlated price and output changes. The changes referred to are proportionate changes; and each commodity's proportionate output change must be weighted by the relative importance of the commodity in consumers' budgets. We will refer to the coefficient of correlation between the proportionate price increases and the weighted proportionate output increases as "rho." We want to know the conditions on which the value of rho associated with differential changes in commodity demands is positive.

These conditions are derived in the dissertation which this essay summarizes. Only the assumptions and the results will be presented here.

In the three-commodity model of differential changes in demand, it was found necessary to make two assumptions in addition to those made in the two-commodity case, if the analysis was not to be completely unmanageable. The first of these assumptions is that aggregate employment is unaffected by changes in both the structure and the average level of real wage rates. Thus, an increase in the demand for labor in a particular industry will induce an increase in employment there which is just offset by a decrease in employment in the other two industries. The second of these assumptions is that real wage rates are initially equal. Thus, an (infinitesimal) redistribution of the (constant) labor force among the three industries will not affect the real value of aggregate output (because of the initial equality of marginal value products).

These assumptions are admittedly unrealistic. Some "virtue by association" may be claimed, however, from the fact that they are implicit in the frequent application of a full employment aggregative model to a multicommodity world. Only on these assumptions is the real value of aggregate output invariant to a change in the mix of commodities demand, real aggregate demand held constant. On these assumptions, an aggregate supply curve can be drawn and, in the range in which we are interested (full employment), the curve will be perfectly inelastic with respect to the general price level (as in Figure 1 above).

The necessary and sufficient conditions on which the value of rho will be positive (in a situation of differential demand changes) are not readily interpretable. But it is possible to derive certain "sufficient" (but not necessary) conditions to warrant faith in the desired result. These sufficient conditions are that (1) all commodities are "net substitutes," and (2) all employments are "substitutes" in the sense that an increase in the real wage rate in one industry will cause a decline in the supplies of labor to both the other industries.

With regard to the second condition, it is possible to imagine pairs of jobs which are complements (for a household or individual who is a multiple job-holder). But these cases are probably few and unimportant enough to be neglected.

With respect to the first condition, it does not require the absence of "gross complementarity" (i.e., complementarity "gross" or inclusive of the Hicksian income effect of a change in the money price of a good, other prices and money income constant). Goods are net complements only if a rise in the price of one good, real income constant, causes a decline in the

demand for the other.

Undoubtedly there are many net complements in the economy. The problems they create for our empirical analysis can be circumvented, however, by lumping complementary combinations of commodities into a single category. Golf balls and golf clubs may be grouped together under "sporting goods"; coffee and cream, bacon and eggs, etc., may be lumped together under "food." In general the available data come preaggregated to the degree that complementarities, at least among consumer goods, are weak and few if there are any.

In an economy in which prices and outputs of (appropriately grouped) commodities never changed except by virtue of changes in the structure of demand, therefore, we would expect the value of rho to be positive. While this result has not been proved for the case of any number of commodities, there is some presumption that if the result holds for three commodities, it is true for any number of commodities.

B. Differential Wage Push

How is rho affected by differential wage push, that is, by wage push which is stronger in some sectors than in others? Let us consider, again, the two-commodity economy of manufactures and services. Suppose that there is a ceteris paribus increase in the wage costs of the manufacturing sector. We assume that the wage push is "ratified" by the monetary authorities so that, if money prices are to be determinate, it must be assumed also that there is "money illusion" in the labor market.[1] Assume, first, that there is money illusion in both labor markets.

At the initial output and employment rates, there will be a relative increase in the price of manufactures. With real income constant (by virtue of the ratification), the substitution effect will cause a decline in the rate of output of manufactures in relation to the output of services. This divergent movement of outputs will be strengthened to the extent that labor migrates from the manufacturing sector (where employment opportunities are smaller) into the service sector. The response of relative output rates is thus the same as in the case of a differential change in commodity demands (favoring services). But the response of the price structure is the reverse: The price of manufactures will rise in relation to the price of services.

In this situation, rho is negative. The price of services will rise less than the price of manufactures; and the output of services will rise more than the output of manufactures (which, in fact, will decline absolutely).

If there is no money illusion in the service labor market, then the two prices will rise in the same proportion, and the new equilibrium output rates will be the same as before. In this case the value of rho is zero. (But zero is a smaller value of rho than the value produced by changes in demands, which is greater than zero.)

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1. That is, an equiproportionate increase in money wage rates and the general price level will produce an increase in the aggregate supply of labor.

Consider now the three-commodity case. Our three-commodity model of differential wage push contains the same assumptions as those made in the two-commodity discussion: constancy of real income ("ratification"), "money illusion," etc. Like the necessary conditions in the three-commodity case of differential changes in demand, the necessary conditions for a negative (or zero) value of rho are too complicated to be interpreted; we will investigate only a set of "sufficient" conditions.

Ceteris paribus, differential wage push will produce a negative rho on the following sufficient conditions: (1) All commodities are "net substitutes," and (2) all cross wage rate effects are zero, i.e., "other" money wage rates do not affect the supply of labor to any industry.

The second assumption is probably unrealistic. (Also, it contradicts the second condition for a positive rho in the case of differential demand changes.) Condition (2) can be replaced, however, by the following conditions: (2a) All employments are substitutes, and (2b) in the two labor markets exerting comparatively little wage push, the disparity between the "cross" wage-rate effects with respect to the third industry's wage rate is small in relation to the "own" wage-rate effects in those labor markets.

The meaning of Condition (2b) can best be conveyed by an example. Suppose that real wage rates have increased in Industry A and have decreased in Industry B. Condition (2b) is violated if this change in the wage pattern causes a greater flow of labor into Industry A from Industry C (where the real wage rate has remained unchanged) than from Industry B (where the real wage rate fell). Of course, utility analysis (or any other credible economic theory) cannot refute that possibility because people may differ. Still, utility analysis makes this possibility appear unlikely. Labor in Industry B is not only being "pulled" toward Industry A, because of the increased A wage rate, but it is also being "pushed" there, due to the decline in the B wage rate; but there is no "own" wage rate effect (i.e., a decline in the C wage rate) operating to push labor out of Industry C. In addition, B workers who were on the margin between working in B and working in C (but not on the margin with respect to Industry A) will want to move to Industry C, thus reducing the net outflow of labor from Industry C into Industry A. Thus, Condition (2b) requires only that the "cross" wage rate effects in Industries B and C (with respect to Industry A's wage rate) do not differ so much as to dominate the "own" wage rate effects, in those industries, in determining the relative supplies of labor in those industries.

In reality, cross wage effect disparities are likely to be small because the cross wage effects themselves are small. While there are workers who are "on the margin," even marginal workers are imperfectly mobile. Not all of the workers who would like to move (in response to increased wage rates elsewhere) are able to move in the short run.[1] In a

1. Labor immobility also reduces the size of the own wage rate effect in any particular labor market, but the effect continues to be large to the extent that there is substitutability between labor and leisure in that labor market.

short-run, comparative-static model, these immobilities—while they are really dynamic phenomena—can be allowed for by supposing that the substitutability of different jobs is small (and hence, that the cross wage rate effects are small).

Conditions (1), (2a), and (2b) appear, therefore, to be fair approximations to reality. Even though they may not be satisfied to the letter, they are not the necessary and sufficient conditions for a negative value of rho. There is plenty of leeway between the latter conditions and our three "sufficient" conditions.[1]

C. Productivity Gains

The third influence upon the value of rho is that of productivity gains.

Typically, productivity gains are greater in some sectors than in others. These differential productivity gains are, from the standpoint of the cost of supply side, just like wage push in their effects on rho. Abstracting from changes in commodity demands (as well as wage push), those sectors where productivity gains are comparatively large will experience comparatively large increases in output and comparatively small increases in prices. Hence, price increases will tend to be negatively correlated with output increases, so far as the cost effects of differential productivity gains are concerned. The greater the differentials between the productivity gains in the various sectors, given the overall productivity increase in the economy as a whole, the lower the value of rho, ceteris paribus.

But productivity gains are not entirely like differential wage push with respect to their effects on rho. If full employment is maintained, the gains in productivity will lead to an increase in real income. Unless the income elasticities of demand for every commodity are equal, the increase in aggregate real income will produce differential shifts in commodity demands. The effect of these demand changes upon rho is not identical to that analyzed in the first section because in the present situation, the real value of aggregate output increases. But unless the elasticities of supply differ widely in the various industries, we should still expect that greater than average price increases will be associated with greater than average output increases. Thus, the demand effects of productivity gains will tend to produce a positive value of rho.

It is not possible to say, therefore, whether the rho produced by the growth of productivity in the economy is greater or less than zero. But there is some presumption that the value of rho associated with the growth of productivity will be between the value of rho produced by differential wage push alone and the value of rho produced by differential changes in demand alone, since productivity gains normally contain elements of both demand changes and supply changes.

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1. Also, if the rho associated with differential wage push were zero, that would still be lower than the value of rho associated with differential changes in demand, which must be greater than zero on the conditions cited above.

Thus far each of these three factors governing the structure of prices and outputs has been discussed as if the other factors were inoperative or constant. In reality, at least the first and third factors discussed (demand changes and productivity changes) are continually bringing about changes in relative prices and outputs. Rho is not zero in the absence of differential wage push. Hence, it need not be negative in the presence of wage push. That being the case, how can the presence of differential wage push be detected from the behavior of rho in the real world?

D. The Correlation Test

We have found that both the value of rho associated with differential changes in commodity demands and the value of rho associated with productivity gains can be presumed to be algebraically greater than the value of rho associated with differential wage push. Therefore, unless these two forces acting upon rho always interact in such a way as to cancel each other out (i.e., assuming that there is statistical independence between these two forces acting upon rho), we may expect that the value of rho which would be observed in the absence of differential wage push will be algebraically greater than the value of rho produced by wage push alone (i.e., in isolation).

Now the wage push hypothesis asserts that labor unions exerted more wage push in Inflation III than in Inflations I and II (if there was any wage push in those inflations). How should we expect the value of rho observed during Inflation III to differ, if that hypothesis is true, from the value of rho observed during the earlier inflations?

If the expected value of rho associated with differential wage push is negative, and the expected value of rho in the absence of differential wage push is positive, then the introduction of differential wage push will "dilute" or reduce the expected value of rho. If the value of rho associated with differential wage push were -0.1 and the value of rho which would be observed in the absence of differential wage push were, say, 0.3, then we should expect the value of the net resultant rho to lie between these two values, i.e., to be lower than 0.3, when there is wage push.

But what if the value of rho associated with differential wage push is not negative but is merely algebraically smaller than the value of rho which would be observed in the absence of wage push? Even then the introduction of differential wage push can be expected to pull down the observed value of rho if the variability of relative prices and outputs attributable to differential wage push is no larger than the variability of prices and outputs attributable to the totality of all other influences upon the price structure (namely, changes in tastes, technology, degree of monopoly, and so forth).

These two propositions, which are proved in the author's dissertation, depend upon the assumption that the rate of wage push in any industry is statistically independent of changes in the structure of demand and technology.[1] The safest interpretation of the correlation test, therefore, would

1. This requirement does not entail that the equilibrium wage rate in any

represent it as a test for the presence of cost push which is autonomous or exogeneous. In terms of the framework of the introductory section, the rho test is best suited to detect a contraction of the cost-push threshold during 1955-57. We cannot be sure that the test will detect the presence of the kind of cost push which is induced when output crosses a stable cost-push threshold. Still, the value of rho may exhibit some sensitivity to cost push even when cost push arises from the latter circumstances.

Much of the dependency between the rate of wage push and the level of employment (if there is such dependence) can probably be eliminated if we correlate only the price and output changes which occur in the course of the inflation proper, rather than those occurring from the upturn of the cycle through the climax of the boom. For the same factors (e.g., the infrequency of contract negotiations) which may cause wage rates to lag behind the demand for labor can be expected to delay wage push. If that is so, then the rate of wage push during 1956 and 1957 in any industry may be exogeneous for our purposes, since it may depend chiefly upon the level of employment during 1955, to the extent it does depend upon employment.

Complete independence between the rate of wage push in any individual industry and the state of demand in other industries may also be lacking to the extent that there is "pattern bargaining." The previous general equilibrium models allow fully for the dependence of one wage rate upon all other wage rates; but they do not allow for the possibility that an increase in the "demand price" of labor in one sector may give rise to wage push inflation in the economy as a whole. This type of induced wage push will arise if, say, a productivity gain of 5 per cent in one sector, productivity elsewhere constant, induces a 5 per cent increase in all wage rates (to take an extreme but clear-cut example).[1]

This theory of wage push appears to postulate the lazy, "satisficing"[2] union which is content as long as no other union is doing better at securing annual wage increases. While it appears to raise as many questions as it answers, this theory may be quite correct. But it does run counter to the other and perhaps more customary assumption that the rate of wage push exerted by any union depends upon the degree of unemployment among its membership. In general, the sector experiencing the greatest wage push (because it is enjoying the lowest rate of increase in productivity) will

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industry be independent of the level of employment there or wage rates elsewhere. But it does entail that the rate of wage push in an industry be independent of the level of employment in that industry.

1. For an exposition of this hypothesis see the letter to the editor of the New York Times, March 25, 1957, by W. J. Fellner.

2. See H. A. Simon, Models of Man (New York, John H. Wiley and Sons, 1957), ch. 14, and R. A. Lester, As Unions Mature: An Analysis of the Evolution of American Unionism, Princeton, Princeton University Press, 1958.

develop increasing unemployment; this will tend to discourage wage push in that sector.

Whatever the merits of this pattern bargaining theory of wage push, its applicability is surely confined to those sectors of the economy where wage rates are negotiated by unions. The fact remains that many industries in the economy are not unionized. Therefore, the "differential" character of union-generated wage push remains. But it should be admitted that the correlation test will be less sensitive to wage push to the degree that wage push is the product of wage-links established by pattern bargaining in the unionized sectors.

The correlation test, as we have seen, consists of asking whether the value of rho observed in Inflation III was algebraically smaller than that observed in the previous inflations. Of course, the observed rho for Inflation III must be "significantly" smaller, in the statistical sense, since it is only the expected value of rho which would have been smaller in Inflation III had there been a comparatively large rate of wage push during that inflation. The value of rho observed during any particular inflation is subject to statistical variation.

The sources of these variations are implicit in the foregoing discussion. For example, if, during Inflation III, the structure of demand was unusually volatile, then, apart from wage push, the value of rho would likely have been larger than in the earlier inflations. If, say, the productivity differentials among industries during Inflation III were comparatively large, but the overall productivity gain was about the same, then the value of rho in Inflation III would likely have been comparatively low.

While the value of rho will fluctuate over time, we have no reason to suspect a "conspiracy" on the part of all the small, independent forces acting upon rho to bias the results of our correlation test. If the value of rho is determined predominantly by one or two important forces (say, the demand for automobiles or the size of agricultural crops), then rho may fluctuate too much for the presence of wage push to be detected; but this is a matter for empirical estimation. Even if rho is greatly influenced by one or two factors extraneous to the wage push question, this fact need not bias our findings.

There is one other factor affecting rho, however, which deserves special mention. In principle, the rho test ought to be regarded as a test for monopoly-generated cost push as much as union-generated cost push. If differential wage push will produce a decline in the value of rho, so too will differential profit push. We have emphasized the wage push interpretation of the test since, on the basis of the distributive shares evidence, if there was cost push during 1955-57, it appears that it was due to wage push. But the results of the rho test must, by themselves, be regarded as neutral as between the two alternative theories of cost push.

IV. Results of the Rho Test and Conclusions

A. Nature of the Data

The ideal data for our purpose would indicate the "value

added," in real terms, and the corresponding implicit price deflator, for every industry in the economy. While value-added data are available in current dollars, there are few existing price series which correspond to the value-added series.

There are two kinds of data available which are more or less suitable for the correlation test: industrial production data[1] and constant dollar data of expenditures by households, businesses, and governments for final products.[2]

By itself, the production data would be inadequate for the purpose at hand. First of all, there are not more than twenty or so production indices for which we can find corresponding price series back to 1946. Wholesale price data are quite limited in detail and scope for years prior to 1954.

Secondly, the index of total industrial production, which these production indices comprise, probably does not cover more than one half of gross national product. Excluded are the output of the wholesale and retail trades, financial enterprises, service industries of all kinds, farms, and public organizations. Processing of semi-final products and their distribution are also not covered.

Finally, there is probably some double counting in these series from the standpoint of national income origination. Some intermediate products, for example, are presumably included under "fabricated metal products" as well as "automobiles."

The real expenditure data have the advantage that they are in a GNP framework so that all of gross national product is covered, and there is no double counting. But these data have their own shortcomings.

First, the available expenditure data fail to describe the expenditures of federal, state and local governments at a level of disaggregation comparable to that provided for business and household expenditures. This problem is acute when substantial changes in the mix of goods bought by the government occur, as during the Korean War period. This point will be elaborated upon below.

Second, while we care only about the total expenditure on each product, the data provided often measure only the expenditure by domestic buyers for whom the product is "final." An example is "gasoline and motor oil." If businesses bid away gasoline from households, we do not want the data to show a decline in expenditures on gasoline. Fortunately, the estimates by the Commerce Department of expenditures on final products are generally based on the "commodity-flow method." The share of total expenditures made by households (or businesses) in the latest base year is

1. The production data referred to are to be found in any monthly issue of The Federal Reserve Bulletin since December 1953.

2. The real expenditure data referred to are contained in U.S. Income and Output: A Supplement to the Survey of Current Business, Washington, U.S. Department of Commerce, 1959.

allocated to households for all subsequent years (until the next census).[1] Thus the household expenditures data will generally serve as a proxy for what is wanted, namely total expenditures.

Third, the expenditure data exclude "purchases" for inventory. This omission is a defect if inventory investment (or disinvestment) is intentional. When inventories are being run down (intentionally), for example, the expenditure figure will overstate the level of total demand for that product. But in situations where firms would like to increase or maintain inventories but cannot expand production quickly enough, it seems better to use the expenditure data. (Such might be the case during the Korean period when prices were raised to clear the market rather than to cover higher costs of marginal output.)

The data used in the correlation tests are principally expenditure data—which provide us with a GNP framework within which we have incorporated some production data.

Data prepared by the Commerce Department and recently published in U. S. Income and Output provide a breakdown of personal consumption into the following constant dollar categories (with the accompanying price deflators) over the period 1946-57:[2] automobiles and parts; non-auto consumer durables; food and beverages; clothing; gasoline and motor oil; "other" nondurables; housing; household operation; transportation; and "other" services. In addition, the Commerce Department provides constant dollar expenditures on the following nonconsumer goods: residential nonfarm construction, construction other than residential nonfarm, producers' durable equipment, and purchases by the federal government and by state and local governments. The sum of these items constitutes gross national product less net exports and inventory investment.

In order to have a more detailed picture of price and output behavior in the consumer goods sector, we have developed price series from data of the Bureau of Labor Statistics to correspond with the following products for which current dollar expenditures are available (and whose sum is non-auto consumer durables expenditures in money terms): household furniture; kitchen and similar household electrical appliances; tableware, glassware, silverware, and dinnerware; "other house furnishings" (principally rugs, curtains, blankets); ophthalmic and orthopedic appliances (principally eye glasses); toys and sporting equipment; books and maps; radios, phonographs, and television sets; and jewelry and watches.[3]

It was not always possible to obtain price series which corresponded well to the expenditure series. For example, the price series used

1. See National Income 1954 (Washington, U. S. Department of Commerce, 1954), pp. 103-106.

2. U. S. Income and Output: A Supplement to the Survey of Current Business, Tables II-5, VII-13.

3. See Table II-4 of U. S. Income and Output.

Table 5

Data for the Rho Test

Identification of Code Numbers Used in the Following Tables

1. Autos and Parts
2. Furniture
3. Kitchen appliances, etc.
4. Tableware, etc.
5. Other household furnishing
6. Ophthalmic and orthopedic appliances
7. Toys and sporting goods
8. Books and maps
9. Radio, Phonograph, TV
10. Jewelry, watches
11. Food
12. Clothing
13. Gasoline and oil
14. Other nondurables
15. Housing
16. Household operation
17. Transportation
18. Other services
19. Residential nonfarm construction
20. Other construction
21. Fabricated metal products
22. Farm machinery
23. Industrial and commercial machinery
24. Laundry and refrigeration equipment
25. Electric apparatus
26. Trucks
27. Aircraft
28. Ship building
29. Railroad equipment
30. Instruments and related products
31. Office fixtures and furniture
32. Business cars
33. Federal government
34. State and local government

I. Price Indices for all Items in GNP Breakdown, 1954 100

	1946	1947	1948	1950	1951	1952	1955	1956	1957
1	77.9	84.3	90.3	94.1	99.4	104.0	102.2	104.8	110.0
2	81.0	87.5	94.9	92.3	101.4	100.4	97.7	98.6	100.6
3	83.1	95.6	100.6	97.2	103.8	103.9	96.0	89.8	87.7
4	65.5	73.6	80.4	86.1	92.2	94.7	104.7	114.7	121.0
5	81.1	86.7	86.2	88.0	103.2	100.7	99.9	103.4	105.7
6	87.5	88.8	90.5	94.5	98.8	101.4	101.3	103.5	107.5
7	81.8	85.5	87.5	92.1	100.3	99.4	97.0	98.9	100.3
8	87.3	85.1	81.4	87.2	98.5	99.7	102.3	105.3	106.6
9	--	--	--	112.6	113.2	106.0	94.7	94.9	98.4
10	--	--	--	92.2	96.2	97.4	100.9	102.6	105.3
11	77.8	89.0	93.5	90.5	99.4	101.6	98.5	99.3	102.5
12	86.1	93.0	98.7	93.6	101.8	100.0	100.2	102.2	103.8
13	70.1	78.6	88.1	90.3	92.1	93.9	101.1	104.1	108.8
14	76.0	85.6	92.1	92.1	97.6	98.1	101.1	103.0	106.6
15	72.6	75.7	80.3	85.5	89.0	92.9	101.3	103.0	105.3
16	82.7	85.1	87.4	90.7	92.9	96.5	100.3	101.3	102.8
17	65.1	71.0	77.1	84.4	87.6	91.6	101.6	103.2	106.8
18	68.5	76.6	82.1	85.0	89.9	93.7	102.4	106.3	110.5
19	65.3	78.4	88.6	90.9	97.5	100.3	103.0	108.1	110.1
20	62.6	74.8	83.1	85.1	93.1	96.5	103.2	109.8	115.5
21	60.1	71.9	78.2	85.0	92.8	92.3	106.4	114.9	118.3
22	62.1	70.8	80.5	88.4	96.2	97.7	100.8	104.4	109.3
23	64.2	72.8	78.9	86.0	95.4	95.9	104.2	114.0	121.7
24	62.7	77.1	82.7	87.4	96.5	96.9	95.6	94.1	92.7
25	68.5	81.3	84.6	88.2	98.1	95.8	101.6	109.7	118.1
26	72.8	81.8	89.0	91.8	99.3	101.9	103.6	111.7	117.6
27	59.8	68.4	73.5	81.1	88.7	91.1	--	--	--
28	64.7	70.7	76.9	81.9	88.4	92.0	--	--	--
29	74.2	79.4	83.6	87.2	93.2	95.2	--	--	--
30	71.3	81.3	87.9	91.1	99.4	97.6	102.9	113.0	123.0
31	64.2	76.3	81.6	87.2	98.3	97.4	104.2	111.9	118.7
32	74.4	83.0	90.7	94.8	99.0	104.3	103.1	108.3	112.7
33	73.0	80.9	84.9	89.7	98.8	99.3	103.9	108.8	115.7
34	63.0	71.5	79.3	83.7	90.2	94.8	102.2	107.2	112.4

II. Real Expenditures (or Production Indices) for all Items in GNP Breakdown, 1946-1957

	1946	1947	1948	1950	1951	1952	1955	1956	1957
1	5.0	7.4	8.2	13.8	11.6	10.6	17.9	14.9	15.5
2	2775	2917	2928	3326	3140	3379	4278	4495	4317
3	2179	3325	3447	4063	3731	3672	4890	5440	5430
4	1928	1832	1812	1778	1775	1700	1778	1664	1569
5	2705	2829	3146	3398	3169	2914	3048	3222	3160
6	453	450	476	514	553	572	676	786	812
7	989	1137	1120	953	901	1000	1440	1593	1693
8	680	630	722	776	790	792	868	955	962
9	--	--	--	2182	2000	2239	2948	3026	3037
10	--	--	--	1486	1523	1619	1819	1871	1799
11	63.0	61.1	60.0	61.1	61.9	63.4	69.0	71.7	73.7
12	21.2	20.2	20.4	20.9	20.8	21.8	23.3	23.9	23.7
13	4.3	4.6	5.0	6.0	6.6	7.1	8.7	9.2	9.4
14	19.1	19.3	19.7	21.2	22.0	22.6	24.4	25.4	25.8
15	19.0	20.6	21.9	24.8	26.1	27.3	30.3	31.8	33.7
16	8.1	8.7	9.1	10.2	10.9	11.2	13.3	14.6	15.3
17	7.8	7.7	7.7	7.5	7.9	8.1	8.2	8.3	8.4
18	30.4	30.0	30.9	33.0	33.3	34.1	39.0	40.9	42.0
19	7.3	9.6	11.4	15.5	12.9	12.8	18.2	16.4	15.5
20	10.0	10.3	11.2	11.9	13.2	13.2	15.7	16.4	16.9
21	101.1	103	104	115	122	121	134	135	139
22	54.0	89	106	102	114	103	91	86	84
23	90.1	107	105	101	128	140	135	156	155
24	57.1	89	114	148	124	108	144	168	151
25	66.3	102	104	101	127	162	174	198	201
26	73.1	108	111	107	125	111	115	112	104
27	108.3	88	103	124	211	368	481	548	608
28	91.0	113	101	77	121	136	115	118	129
29	56.6	93	107	72	89	74	42	63	77
30	81.0	100	105	114	128	142	149	166	172
31	85.3	99	105	104	114	116	115	122	120
32	1.34	2.28	2.39	3.40	2.70	2.22	3.45	2.51	2.65
33	28.6	19.5	24.6	24.7	41.4	54.7	45.1	43.3	43.9
34	15.7	17.8	19.2	23.5	24.1	24.5	29.7	30.9	32.3

1, 11-20, 32-34 in billions of 1954 dollars.
2-10 in millions of 1954 dollars.
21-31, 1947-9 100.

III. Weights Assigned Items in GNP Breakdown
(in per cent)

	1946	1947	1950	1951	1955	1956
1	1.95	2.76	4.64	3.62	4.67	3.79
2	1.12	1.13	1.09	1.00	1.08	1.08
3	.90	1.41	1.41	1.28	1.20	1.20
4	.63	.60	.55	.51	.47	.46
5	1.09	1.09	1.07	1.03	.77	.81
6	.20	.18	.17	.17	.17	.20
7	.41	.43	.31	.28	.35	.38
8	.30	.24	.24	.24	.23	.24
9	--	--	.88	.71	.71	.70
10	--	--	.49	.46	.47	.46
11	24.56	24.09	19.76	19.31	17.34	17.27
12	9.15	8.32	6.99	6.65	5.96	5.92
13	1.51	1.60	1.94	1.91	2.24	2.32
14	7.27	7.32	6.98	6.74	6.29	6.35
15	6.91	6.91	7.58	7.29	7.83	7.94
16	3.36	3.28	3.31	3.18	3.45	3.59
17	2.54	2.42	2.26	2.17	2.13	2.08
18	10.43	10.18	10.02	9.40	10.19	10.54
19	2.40	3.32	5.04	3.93	4.77	4.29
20	3.16	3.41	3.61	3.86	4.13	4.39
21	.34	.38	.26	.27	.23	.26
22	.32	.54	.68	.69	.54	.60
23	1.79	2.14	1.85	1.98	2.18	2.42
24	.23	.39	.31	.25	.30	.33
25	.56	.92	.65	.63	.66	.74
26	.68	1.01	.94	1.00	.63	.70
27	.08	.06	.02	.03	--	--
28	.09	.11	.03	.05	--	--
29	.18	.28	.27	.34	--	--
30	.34	.42	.36	.33	.36	.40
31	.25	.31	.23	.28	.27	.30
32	.50	.84	1.15	.84	.72	.80
33	10.47	6.70	7.90	12.84	11.94	11.42
34	4.96	5.62	7.04	6.81	7.73	8.03

to deflate money expenditures on "ophthalmic and orthopedic appliances" was the BLS series on the cost of eye glasses including eye examination. No price data exist at all for books and maps nor is there any price series prior to 1950 for radios, phonographs, and TV sets and jewelry and watches. Wherever possible retail price indices were used; but wholesale prices had to be used for "jewelry and watches" and for "toys and sporting goods."[1]

In the case of producers' durables expenditures it was also desired to have more detail. The Commerce Department data in U. S. Income and Output gives real expenditures on some twenty categories of capital goods, as well as the corresponding implicit price deflators, for the years 1946-54. Inasmuch as extension of these series through 1957 would have required use of the Federal Reserve production data, we elected to use the latter data throughout, in order that the data for each of the three inflations be comparable. The Commerce Department's implicit price deflators for these goods were then grouped and averaged so as to yield price indices corresponding to the Federal Reserve's capital goods production indices.[2] Eleven production indices were employed: fabricated metal products; farm machinery (including tractors); industrial and commercial machinery; laundry and refrigeration equipment; electrical apparatus; trucks; aircraft; shipbuilding; railroad equipment; instruments and related products; and office furnishings and fixtures.

B. Results of the Computations

There are nine time intervals for which correlation coefficients were computed: 1946-47, 1947-48, 1946-48; 1950-51, 1951-52, 1950-52; and 1955-56, 1956-57, 1955-57.

Values of rho were computed for all items, all items except housing, all items except housing and the federal government, and in the case of the first inflation, all items except housing, federal government and food.

We prefer to neglect the computations made which included housing. The amount of housing, in real terms, "bought" by households in any year is dependent almost entirely upon the stock of housing available during that period. An increase in the demand for housing will produce no significant increase in the supply for a year or two. A decline in the demand for

1. The Commerce Department's implicit price deflator for non-auto consumer durables was used as a "control total." For the inflationary years, it was found that the appropriately weighted index of our price series (based on BLS data) came very close to the Commerce deflator so that only a small (linear) correction of our series was required to cause this index to equal the Commerce deflator.

2. Price indices for the producers' durables series in the years 1955-57 (for which Commerce deflators are as yet unavailable) were drawn from BLS wholesale price data. However, the latter do not provide price indices for aircraft, shipbuilding, and railroad equipment.

housing cannot be expected to affect the weighted proportionate increase in the amount of housing during the current year. Inasmuch as residential nonfarm construction is included among the items whose price and output changes are correlated, it can probably do no harm, and may do some good, to take out housing.

Looking at the values of rho obtained from the computations with "all items except housing," which are tabulated in Table 6 below, we find that the correlation test has to some degree validated itself. Suppose, as is generally agreed, that there was little or no wage push during Inflation I. Then we would hope that the values of rho in those years were positive. For if rho were negative without wage push (due, say, to large differentials among the productivity gains), then the introduction of differential wage push might have but a negligible (downward) effect on the expected value of rho. If that were the case, there would be little chance that the observed values of rho in Inflation III—if it was a wage-push inflation—would be significantly smaller (algebraically) than those observed in Inflation I. But, fortunately, the rho's are positive throughout Inflation I.

Table 6

Tabulation of Correlation Coefficients

Year	All Items but Housing	All Items but Housing and Fed. Gov't.	All Items but Housing, Fed. Gov't., and Food	All Items
1946-47	.0922	.1431	.2201	.0563
1947-48	.0889	.3412	.3470	.0817
1946-48	.2459	.2517	.3131	.1835
1950-51	.1404			.1304
1951-52	-.0903			-.0846
1950-52	.0584			.0571
1955-56	.0659	.0802		.0364
1956-57	.1489	.0007		.0651
1955-57	-.0750	-.0506		-.1133

Some increase in the value of rho results from the omission of the food data from the calculations. Removal of food from the 1946-48 computation increases the value of rho, by more than 0.06. There was apparently a poor crop in 1948 and crop failures, of course, are unmistakably like wage push in their effect upon rho.

The behavior of rho during the second inflation is less encouraging in this respect. It may be noted, however, that the movement of the wholesale price index between 1951 and 1952 was very slight so that the inflation

between those years may have been due largely to a lagged response by retailers to the previous rise in wholesale prices.[1] Due to these lags, it may well be true that a high value of rho in the first year of an inflation increases the probability of a low value of rho in the second year.

Output lags may be as important as price lags. Supplies may take more than a year to adjust to changed costs or demand. By reason of both these lags, it appears that the biennial rho's are better indicators of the presence of wage push than the annual (year-to-year) correlation coefficients.

It seems probable that the value of rho for the interval 1950-52 would be higher if it were possible to combine with automobile and truck production, for example, the production by the auto industry of defense goods it sold to the federal government during the Korean period. It is clear that the military build-up during the period 1950-52 must have reduced the coefficient of correlation between the prices and outputs of nongovernment goods included in our computations, since that build-up withdrew resources, otherwise employed in the production of private goods, in differential magnitudes from the various industries. Hence, price increases were negatively correlated, on the whole, with increases in the output of commodities for private consumption.

The reason that this wage-push-like phenomenon did not lower the overall rho more than it probably did is that the price and output changes in the government sector were positively correlated and strongly so, so that on balance, the private sector being combined with the government sector, the value of rho was perhaps not much lower by virtue of the military build-up.[2]

It is appropriate, therefore, to include federal government expenditures in our computations in Inflation II. But it is interesting in the cases of the other inflations, if not easy to tell how appropriate, to deduct the federal government. Of course this is not tantamount to removing the government from the economy! All that it is possible to do is to remove the effect upon the correlation coefficient that is visibly or "apparently" that of the federal government.

The basis for our interest in the effect on rho of the government data is that government expenditures are large relative to GNP. The weighted proportionate changes in government expenditures are generally very large, therefore, so that the behavior of government expenditures and prices has a great effect on the value of rho.

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1. The 1951-52 case is reconsidered below.

2. Since aggregate government expenditure is included in the computation, why should the build-up have depressed the value of rho at all? The data on government purchases are aggregated while the data on nongovernment purchases are detailed. Hence, changes in the mix of government goods bought, total government expenditures constant, affect the sample rho only through the price and output changes induced in the private sector, where the changes are negatively correlated as explained above.

Turning our attention to the computations for Inflation III, we find that the biennial value of rho for that inflation was negative. The annual rho's, especially that for 1956-57, were fairly high. This was attributable mainly to the behavior of the federal government data.

C. Significance of the Results

The "statistical significance" of any sample statistic depends upon the size of the sample. That is true of our sample rho's on one condition.

The principle underlying the correlation test is that the greater the force of differential wage push in the economy, the lower will be the expected value of the coefficient of correlation between the proportionate price increases and the weighted proportionate output increases of all the commodities in the economy. A random sampling of just a few of the commodities produced in the economy would not yield meaningful results. We could not be sure that any evidence of wage push in those industries sampled was not attributable to their loss of resources to other industries enjoying demand pull. Thus, the correlation test requires that we sample exhaustively from the economy, i.e., that our price and output indices account for all of GNP.

Yet, the statistical significance of our test results does depend upon the size of the sample, i.e., upon the number of indices in the sample. Were this not so, we could have been content with a two-sector breakdown of GNP. Given the very large number of commodities produced in the U.S. economy, we will have more information regarding their price and output changes, the greater the number of indices in our sample. It is approximately true that each index added to the sample—each additional bit of disaggregation—constitutes an additional, independent observation.[1] The greater the number of observations, the greater will be the reliability of the sample rho as an estimate of the true value of rho in the (infinite) population of potential price and output changes that might have been generated during the time interval in question. Hence, we may use the number of indices in our sample as a measure of sample size.

The "null hypothesis" to be tested states that there was no more wage push in Inflation III than in the two earlier postwar inflations. It states that the sample rho's of Inflation III were drawn from a population with a rho as high or higher than the population rho's of Inflations I and II. This hypothesis is tested against the "more wage push," or alternative hypothesis, that the sample rho's of Inflation III were drawn from a population in which rho was smaller than in the earlier inflations.

These hypotheses require a "one-tailed" test. We test to see whether the positive difference between the sample rho's of the first two inflations and Inflation III is significant at some prescribed confidence level. In general, the sample values of rho, and therefore the differences between

1. Each observation is not completely independent due to the general equilibrium relationships; and the degree of independence diminishes as we approach the brand name stage.

pairs of sample rho's, are not normally distributed. However, rho's z-transformation, due to Fisher, is "almost normally" distributed for sample sizes greater than eleven or so. Likewise, the difference between pairs of sample z's is almost normally distributed, with mean equal to zero and standard deviation given by

$$\sigma_{z_1 - z_2} = \sqrt{\frac{1}{n_1 - 3} + \frac{1}{n_2 - 3}}$$

where n_1 and n_2 are the sizes of the samples.

The difference between pairs of sample z's as a ratio of the standard deviation (of the difference) is t-distributed with infinite degrees of freedom.[1] If the sample pairs are drawn from the same population, this ratio—let us refer to it as the "t ratio"—can be expected to exceed 1.645 less than once in twenty times. Hence, if the difference between Inflation I's z and Inflation III's z yielded a t ratio greater than 1.645, we would reject the null hypothesis that the z's came from the same population at the 95 per cent significance level. Similarly, there is less than a one in ten chance of obtaining a t ratio (from z pairs drawn from the same population) greater than 1.282. Sample results producing a t ratio greater than 1.282 would entitle us to reject the null hypothesis with 90 per cent confidence.

Use of the 90 per cent confidence level entails a .10 probability of committing a Type I error, viz., rejection of the null hypothesis when it is true. Use of the 95 per cent confidence level reduces the probability of a Type I error to .05. However, the smaller the probability of a Type I error, the greater the probability (if the test is uniformly most powerful) of a Type II error, viz., acceptance of the null hypothesis when it is false. Contemporary sentiment favors choosing the probability of the Type I error in a way that takes into account the relative costs and probabilities of the two types of errors. While this choice problem is always difficult (what are the relative costs?), it is intractable in the present instance since the probability of the Type II error is undefined. The alternative hypothesis (more wage push) fails to specify a particular value of rho, so that the probability of its rejection, when it is true, cannot be computed (for various confidence levels).

If there is no exact confidence level which is optimal in the present context, there are still two reasons for preferring the 90 per cent confidence level to the more customary 95 per cent confidence level.

First, if it is appropriate to use a 99 per cent confidence level in samples which are larger than usual—because the gains from the additional observations should be "spent" on reducing the probabilities of both kinds of errors—then, by analogy, in smaller than average samples it is appropriate to spread the burden of so few observations over both kinds of errors. Accordingly, we might choose a 90 per cent confidence level so that the

1. George W. Snedcor, Statistical Methods, 5th ed. (Ames, Iowa State College Press, 1956), pp. 173-179.

probability of the Type II error is within reasonable bounds.

Second, while no one bothers to test null hypotheses which are not suspect, suspicion of the no-wage-push hypothesis is grounded not only on hunch or casual observation of wage negotiations but also upon the aggregative evidence—particularly, the relative shares data—presented above. Readers who put considerable stock in the aggregative evidence may justifiably settle for a confidence level lower than the customary 95 per cent.

Table 7 records the t ratios relating to eight pairs of z's. None of the t ratios permit rejection of the null hypothesis at the 95 per cent confidence level. Three comparisons of the sample z's are significant at the 90 per cent level.

The comparison of Inflation III with Inflation I provides the best case against the null hypothesis. The difference between biennial sample rho's for these periods is significant at the 90 per cent level (item 1, Table 9). When the government is removed from this correlation, the biennial rho for Inflation III is not significantly lower (item 4).

If, from the Inflation I correlation described in item 4, we deduct food, then the sample rho for Inflation III is again significantly lower than that for Inflation I (item 2). It is true that if we had also deducted food from the Inflation III correlation, thus achieving nominal comparability, the sample rho for the latter inflation would also have risen. But food contributes negatively to the biennial rho for Inflation III in the very manner we would expect if there were wage push in the nonfood sector: real consumption of food and beverages rose more than average between 1955 and 1957 while the price of food and beverages rose less than average. Whereas, in Inflation I, the negative contribution of food appears due largely to poor crop yields toward the end of Inflation I.

Most of the other comparisons of the correlation coefficients failed by a wide margin to permit the rejection of the null hypothesis. This is especially true of those comparisons which pooled the correlation coefficients of Inflation I with those of Inflation II. There is, however, one interesting exception.

Several economists have voiced the opinion that 1951, rather than 1955, marked the debut of wage-push forces in the U. S. economy. Recently, Walter A. Morton wrote, "I am inclined to believe that cost-push has been actively present since 1951 and that wage-push has been an important, though not the only, factor in the cost-push."[1]

We may modify the alternative hypothesis to state that the sample rho's commencing with 1951 have come from a population with a lower rho than the rho of the population prior to that year.

Pooling together the correlation coefficients for 1946-47 (all commodities less housing and federal government), 1947-48 (all commodities less housing and federal government) and 1950-51 (all commodities less housing), and pooling together the correlation coefficients for 1951-52 (all

1. W. A. Morton, "The Role of Labor in Postwar Inflation," reprinted in The Monthly Labor Review, 82, no. 2 (February 1959), p. 132.

Table 7

Tests of Significance of Difference Between Rho's

Correlations	Value of t
1. 1946-48 and 1955-57, all commodities less housing	1.302[a]
2. 1946-48 (all commodities less housing, government, and food) and 1955-57 (all commodities less housing and government).	1.350[a]
3. Pooled 1946-47, 1947-48, 1950-51 and pooled 1951-52, 1955-56, 1956-57. (All commodities less housing and government provide z estimates for 1946-47, 1947-48, 1955-56, and 1956-57. All commodities less housing provide z estimates for 1950-51 and 1951-52.)	1.331[a]
4. 1946-48 and 1955-57 (all commodities less housing and government).	1.120
5. Pooled 1946-47, 1947-48 and pooled 1955-56, 1956-57. (All commodities less housing and government provide z estimates for 1946-47 and 1947-48. All commodities less housing and government provide z estimates for 1955-56 and 1956-57).	1.107
6. Pooled 1946-48, 1950-52 and unpooled 1955-57. (All commodities less housing provide z estimates.)	.947
7. 1950-52 and 1955-57 (all commodities less housing.)	.504
8. Pooled 1946-47, 1947-48, 1950-51 and pooled 1951-52, 1955-56, 1956-57. (All commodities less housing provide z estimates.)	.440

a. Significant at $t_{.10}$.

items but housing), 1955-56 and 1956-57 (all items but housing and government), we find that the pooled estimate of rho in the latter group of years was lower than that for the former group of years at the 90 per cent significance level (item 3).

D. Conclusions

The macroeconomic evidence presented above gives some support to the wage-push hypothesis. Annual total corporate profits declined throughout the months of rising prices between 1955 and 1957. This fact is hard to square with a simple demand expansion explanation of Inflation III. But since corporate profits depend upon the structure of demand as well as the level of aggregate demand, it is possible that corporate profits could contract in the face of an increase in aggregate demand. In a world of imperfect competition and foresight other explanations could be proposed.

The results of the correlation test also indicated the presence of a greater amount of cost push during 1955-57 (and possibly 1951-52) than during the earlier postwar inflationary periods. It is not possible to infer from this test alone that the cost push was wage push. But these results, when considered in conjunction with the distributive shares data, point to the conclusion that there has been an increased amount of wage push in the economy since 1955 or perhaps as early as 1951.

It is the propensity of the economy toward wage push—measured at a given level of employment—more than the actual rate of wage push experienced (which may depend upon the employment level) which is significant for economic policy. Since relative unemployment during Inflation III was on the whole as high or higher than during the previous inflations, it may be guessed that the propensity of the economy for wage push has increased since the war. But this is only a guess since the cost push from wages during Inflation III may have been merely "transient"; stabilization of employment at its peak level of 1957 might not have produced an endless creeping inflation. The wage-push threshold may not have been crossed.

The present study has been addressed to qualitative questions of the sort: more wage push? a lower wage-push threshold? Important questions of magnitude have still to be answered. To what extent would prices have risen between 1955 and 1957 in the absence of wage push? That is, what rate of inflation would have resulted had unemployment, as a proportion of the labor force, been stabilized at its 1957 level? What was the maximum employment ratio consistent with price stability? The exact terms on which we can trade unemployment against inflation remain to be discovered.

LIFE INSURANCE INVESTMENT—THE EXPERIENCE OF FOUR COMPANIES*

Leroy S. Wehrle

The increasing proportion of individual savings invested in financial intermediaries makes the demand for securities of these institutions a subject of vital interest. However, current economic theory, which is designed to explain an individual's selection of portfolio securities, is not adequate to explain a financial intermediary's demand for portfolio securities. The liability contract between depositor and financial institution exerts an independent influence on the institution's demand for securities. Even though a savings bank depositor may desire maximum return on his deposit, the bank will not accommodate this desire so long as it supplies the joint product, demand liquidity and interest return. For each financial institution, the nature of the liability contract by which the funds are received is different; hence each institution has a somewhat different demand function for securities.

The following study utilizes a variant of a theory of portfolio choice, as developed by Mr. Harry Markowitz and Professor James Tobin,[1] to examine the actual portfolios of a particular financial intermediary, life insurance companies. The theory is modified appropriately to account for the particular investment risks associated with the liabilities of life insurance companies. The purposes of the investigation are to determine the important variables which control life insurance investment and to investigate the similarity of investment policies of different companies. For example, to what extent do life companies attempt to maximize yield, how do they hedge the risk arising from the uncertainty of future interest rates, to what extent do they need liquidity, marketability, etc.? The empirical study consists of an intensive examination of the portfolios of four life insurance companies during the postwar years.

Before presenting the results of the empirical study, it is necessary to describe the relevant aspects of the life insurance contract, list the various attributes of market securities, and briefly survey three different views concerning the principles of investment for life insurance companies.

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1. Cf. Harry Markowitz, "Portfolio Selection," The Journal of Finance, March 1952. Also, more recently, Portfolio Selection, Monograph 16 of the Cowles Foundation, Wiley, 1959. See also James Tobin, "Liquidity Preference as Behavior Towards Risk," Review of Economic Studies, XXV (2), February 1958.

Needs of Life Companies, relationship to the life insurance contract.

"Life insurance provides cover against risk of death or survivance and it provides an investment service involving guarantees of future capital security and long-term yield."[1] Life insurance policies are essentially contracts for the future delivery of specific amounts of dollars at specified dates in the future in return for agreed inflows of dollars in a prescribed manner through time. That the benefit payments and premium receipts are predictable stems from the single fact that mortality experience for large groups is predictable. The unique risk of such a contract derives from the circumstance that the interest rate to be earned in the future, on both current and future premium receipts, is guaranteed today. This income risk is one of the paramount aspects of the investment situation of life insurance companies. Experience has proven the other two factors affecting the cost situation, mortality experience and cost of operations, to be generally predictable.

Market Possibilities, the attributes of securities.

The traditional theory of portfolio choice describes the individual as choosing those securities that maximize the value of one variable, expected return. The introduction of uncertainty of future events increases the number of relevant attributes (variables) related to any security; the individual must choose securities which yield the optimum combination of attributes (variables). The security attributes considered are: (1) return —interest or dividend, (2) default risk—the possibility that interest or principal will become defaulted, (3) marketability or saleability—the possibility that a security can be liquidated quickly at its market price (e.g., mortgages are less marketable than bonds), and (4) income risk—the degree to which future interest return is predictable, which is greater as maturity is longer. The income of a forty year bond purchased today is more predictable than is the income of 160 consecutive Treasury Bills. The market relationship between yield and maturity is referred to frequently and is called the maturity yield function. Yield is placed on the ordinate and maturity on the abscissa. An increasing yield function describes a market situation in which the longer the maturity, the higher the yield.

Three Views of Life Insurance Investment, a brief survey of the literature.

Though all investment officers choose their portfolios from approximately the same selection of market securities (attributes), there are several reasons why different officers pick different collections of securities (attributes).[2] First, various officers visualize the needs of life insurance

1. R. J. Kirton and A. T. Haynes, "The Structure of a Life Office," Transactions, vol. 21 (1953).

2. This study is oriented toward explaining the collection of attributes of securities or the investment strategy, and not toward explaining the tactics (particular securities) chosen to implement the strategy.

companies differently; some think yield is most important while others concentrate on minimizing default risk, etc. Second, preferences toward risks and return vary among investment officers independent of their judgment concerning the needs of the companies. Some officers are more willing to take "compensated" risks than others. Third, even if all preferences and needs are the same, there are alternative ways of matching needs and market possibilities (attributes). For example, a portfolio composed of one-half Governments and one-half Baa Industrials may contain the same default risk as a portfolio containing all Aa Industrials.

The following, very brief, summary of three different investment views is heavily indebted to the interesting and stimulating discussion in the Scotch and British actuarial journals.[1] The sketches of the three portfolios are necessarily very brief; only the most salient points are noted. Furthermore, the views are presented in narrow, idealized form in order to sharpen the contrast, rather than to depict faithfully the views of the authors.

The Capital Security Portfolio, the trustee viewpoint.

> While life insurance is not legally a trust but a contract, it is accurate to say that the relationship between the management and the policy holder partakes of the nature of trustee and beneficiary.... The traditional objectives of trustee investment are first, safety; second, yield; and third, liquidity.[2]

The set of investment principles which best reflects this point of view was presented by A. H. Bailey, Esq. in a succinctly written article[3] in 1862. The basic proposition of this viewpoint is that, "We are trustees .... The necessity of seeing to it that the funds of the company are safe beyond any doubt is after all the number one problem."[4] Default risk is the paramount risk. The risk of unexpected cash drains (deriving from policy conversions and unanticipated mortality experience) is also important, but subsidiary to default risk.

This capital security viewpoint is colored throughout by its defensive investment attitude, defensive toward risk of default and defensive

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1. The most important journals are The Journal of the Institute of Actuaries, Cambridge, England (hereafter called The Journal), and the Transactions of the Faculty of Actuaries, Edinburgh, Scotland (hereafter called Transactions). The specific articles and authors are given in the Bibliography.

2. W. Penman, "A Review of Investment Principles and Practices," The Journal, vol. 64 (1933), pp. 121-152.

3. A. H. Bailey, Esq., "On the Principles on which Funds of Life Assurance Societies Should Be Invested," The Journal, vol. 10 (1862), pp. 142-147.

4. Penman, "A Review of Investment Principles and Practices."

toward risk of cash drains. Default risk is considered an intolerable and irreducible evil. There are two categories of assets, those that are relatively risky and those that are relatively safe. The gulf dividing these two classes of assets cannot be bridged by increasing the coupon yield of the asset; increased coupon yield does not "compensate" for increased default risk. The risk of cash drains is deemed minimal because of the large and predictable cash inflow, yet since even the slight chance of a public embarrassment is viewed with trepidation, it is thought prudent to insure against such embarrassment by maintaining a liquidity balance. Income risk is not explicitly discussed by these writers.

In summary, this investment view treats the "guarantee of future capital security" as the essential guarantee of the life insurance contract and hence as the essential objective of life insurance investment. Yield is an important, but secondary, consideration.

The Income Security Portfolio, hedging the future interest uncertainty.

> Ability to meet contracts depends on capacity to earn a minimal rate of interest...[therefore] marry the assets to the liabilities as far as possible.[1]

Within the British and Scotch literature, primary emphasis since 1862 has been placed on maintaining capital security. It was only during the 1920's that Mr. C. V. Coutts published an article[2] that vigorously attacked the capital security viewpoint. It was the contention of this article and succeeding articles and discussions by Swift, Sharp, Kirton, Pegler, Binns, and Anderson that the emphasis of life insurance investment should be on the "guarantee of long-term yield." Stress should be placed on the long-term solvency position of the company with investment policy oriented toward insulating the portfolio from any unfavorable effects of future movements of the interest rate.

The authors suggest that income risk be minimized by purchasing long maturities which, in some sense, match the maturities of the liabilities of the policy contracts.

> When one considers that the assumptions as to interest earning ability have been made in the light of conditions at the point of issue but that actual investment will occur at successive later dates, it seems clear that in theory the most stable position can be obtained by investing the increasing fund in its earlier years in very long securities with a gradual shortening of term of investment of successive increments. Normal investment of a life insurance

1. C. R. V. Coutts, "Notes on Life Assurance Investment Policy," The Journal, vol. 56 (1925), pp. 121-152.

2. Ibid.

> fund implies a distribution of interest and principal payments which will in all future years be sufficient to meet the net cash outgo on the business in force. This is the only policy which can insulate the fund against adverse effects of changes in interest rates.[1]

If the company guarantees to earn 3 per cent over a thirty year period, it should purchase assets with coupons of at least 3 per cent and maturities of at least thirty years. If securities of shorter maturity than the liability maturities are held, the solvency position of the company is in jeopardy if there is a secular decline in interest rates. The company is forced to reinvest its funds at lower and lower interest rates while paying out benefits guaranteed at the original higher interest rate. If securities of longer maturity than the liability maturities are held, the company will not participate in the increasing yields if a trend of secularly increasing interest rates develops. In this case the company is frozen in low coupon securities for a longer period than necessary and is not able to participate in the increasing yields of the market (except for new cash inflow). Thus the "costs" of interest increases and decreases are not symmetrical, one involves insolvency while the other involves a possible worsening of the competitive position. The fundamental premise of this point of view is that the certainty of protection against insolvency is more important than the chance of earning higher yields.

Increased default risk securities are acceptable within this portfolio so long as the additional coupon premium appears more than sufficient to compensate for the additional risk. No specific liquidity balance is recommended. "The circumstances of the life insurance business are not such as to require a significant liquid position with the consequent loss of yield which this entails."[2]

In summary, while the first portfolio was defensive toward default risk, this portfolio is defensive toward income risk and suggests the purchase of long maturities. Interviews with life investment officers make it apparent that "keeping long" is viewed as a general aim, and does not require the attainment of any specific average maturity.

The Competitive or Yield Portfolio, emphasis on high yield.

> An active investment policy is a policy which relates the distribution of the investments held at any time to the economic conditions anticipated. This policy involves a willingness to vary the individual investments and to vary the proportions of different groups and classes (and maturities) of investments readily and if considered necessary, often....[3]

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1. W. M. Anderson, "The Long View of Life Insurance Investment," General Proceedings, American Life Convention, 1954; pp. 355-372.

2. Ibid.

3. A. C. Murray, "The Investment Policy of Life Assurance Offices,"

This viewpoint is dominated by a desire to maintain high portfolio yield. This can be accomplished, according to Rechnell, Murray and Swift, by maintaining a flexible approach toward investment, by utilizing caution coupled with discriminating judgment. According to these writers many of the investment risks associated with life insurance are unavoidable,[1] and excessive efforts devoted to reducing these risks are not only unrewarding but dangerous in that they divert attention from the possibility of increasing yield. Whereas the capital security writers suggest a low default risk portfolio regardless of existing default-risk yield differentials and the income security writers suggest a low income risk position (long maturities) regardless of existing maturity yield differentials, the competitive portfolio writers suggest a flexible attitude toward both these risks. They state that risks are relative, that increased yield compensates for increased risk. A strong offensive which increases yield makes unnecessary a strong defensive to decrease risk.[2]

Moreover, the competitive portfolio investors believe it is both necessary to increase yield, to maintain the long-term competitive growth situation of the company within the industry, and possible to increase yield, by maintaining a flexible approach toward investment.

The necessity of maintaining high yield rests on the premise that the competitive position of a company within the industry is extremely important. All the problems faced by a life company are easier for the fast growing company than they are for the slow growing company.

The second point relating to the possibility of increasing yield is not obvious. Why should losses incurred through mistaken judgments be

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Transactions, vol. 16 (1937).

1. For example, the many call provisions prevent income security from ever really being obtained and unless Governments are purchased default-risk is never zero.

2. This is, of course, a very proximate statement. Whether one objective can be increased only through the loss of some other objective (substitutability) or whether two objectives can be jointly increased (complementarity), depends on market prices (maturity yield differentials and default risk differentials) and expectations of the future (future interest rates and default experience). Consider three cases: (a) High yield and low default risk appear to be substitutable goals for a very diversified portfolio. Willingness to add default risk increases yield. Cf. W. Bradock Hickman, Corporate Bond Quality and Investor Experience, NBER, pp. 75 ff. (b) High yield and low income risk are substitutable if the maturity yield function slopes downward and complementary if it slopes upward. (c) Low defaultlt risk and low income risk are substitutable if one believes that uncertainty and unpredictability increase with time. Then for any one company, it is not possible, certeris paribus, to increase the maturity of its bonds and hold default risk constant.

less than gains incurred through correct judgments? The answer given by these writers is that many institutional investors are constrained in their choice of securities by legal, traditional, governmental, and other restraints. This causes yield spreads or "pockets" to develop from which a "free" investor is able to pick and choose to his advantage.

Several methods of increasing yield are mentioned within the literature and these are outlined here for future reference.

1. Choose maturities which increase yield by choosing the maturity having the largest maturity yield differential. This is termed following the maturity yield function and may include either choosing securities

   a. from among the entire range of maturities. This is considered unlikely because of the high income risk of short maturities.
   b. from among the maturities longer than 10 or 15 years. Investment officers state that they would never purchase very short maturities (commercial bank type maturities) because they are long-term investors. The slope of the maturity yield function beyond 10 to 15 years then determines the particular maturities which are chosen.

2. Form expectations of the cyclical pattern of business activity and of interest rates, then invest accordingly. This is defined as cyclical policy.

   a. go short in low interest periods, possibly sell currently high priced long maturities.
   b. go long in high interest periods, possibly sell short maturities.

3. Form expectations of the average level of the long-term interest rates over an extended future period.

   a. go short when current long rate is less than expected long rate.
   b. go long when current long rate is above expected long rate.

Besides purchases which increase yield, it is possible to make sales which increase yield. The different portfolio writers take different views on the desirability of incorporating sales into investment policy. The capital-security writers believe that securities should be held to maturity. The income security and competitive writers suggest that securities be sold whenever yield can be increased. The precise meaning of increased yield will be examined in the next section.

In conclusion, the competitive portfolio affirms the advantages of increased yields while not denying the importance of default and income

risk. It represents an offensive policy toward yield rather than a defensive policy toward risk. Also the writers suggest sizeable liquidity holdings balance as a transactions balance to facilitate opportune purchases.

Table 1 presents a summary of the different investment views. As a gross simplification it can be said that the capital security writers stress low default risk, the income security writers stress long maturities and low income risk, and the competitive writers stress high yield. It is the purpose of the empirical study to reveal to what degree these idealized portfolio views describe and aid in the analysis of the actual portfolios during the postwar period.

An Empirical Investigation of Four Companies

The results and analysis of an intensive empirical examination of four legal reserve life insurance companies of the United States are presented in the following section. Before presenting the analysis it is necessary to describe the empirical study.

The discussion of each company commences with a description of the company which is derived from facts concerning the company and from impressions gained from interviews with various investment officers. Following the descriptive paragraph there is a paragraph of investment objectives which summarizes the results of the portfolio analyses, and a paragraph which summarizes the major changes in the distribution of portfolio assets during the period studied. Then the analysis follows under the headings, Yield, Maturity, Trading, Liquidity and Cyclical Policy. Default risk is not discussed under a separate heading because few data concerning this risk are available. The exact procedure will vary from company to company. The aim is to establish the pattern of investment behavior as well as the motivation for the behavior whenever possible. No single statistic is sufficient to identify the portfolio type, yet several statistics used in conjunction are sufficient. For instance, large trading activity (sales and purchases) is possible in either an income security or a competitive portfolio. Before the specific type of portfolio can be identified, it is necessary to determine whether the sales were made to increase interest yield or to obtain capital gains. It is not possible or desirable to segment the discussion within the five headings; what is said under one heading always reflects another decision under another heading.

Within the study, primary emphasis is placed on an examination of investment flows rather than on portfolio stocks. The motivations and objectives underlying an investment decision are quite directly revealed by examining flow statistics (decisions to sell and to purchase) while these investment motivations are disclosed only indistinctly and with a time lag by examining the changing stock of portfolio assets. Furthermore, an examination of the stocks can never disclose turnover within a year, that is, the volume of securities which either mature in less than one year or are sold and repurchased during the same year. Also an examination of stocks cannot disclose the extent to which assets were changed through volition of the life company (sales and purchases) and the extent to which the assets were changed because of calls and redemptions made by the borrowing companies.

Table 1
A Summary of Three Investment Views

portfolio objectives	Portfolio Types: Capital-Security	Income-Security	Competitive
Yield	low-because of high proportion of Governments, blue-chips, and small proportion in equities	low-if declining maturity yield function high-if increasing maturity yield function	high-if maturity yield function is steeply sloped or changes slope frequently, and/or if interest rates have followed cyclical patterns
Maturity (income risk)	no particular maturity policy is advocated	long-with little variation of mean maturity of acquisitions or of bond holdings; exact length should bear some relationship to income-risk situation of the company	variable-will choose high point on maturity yield function beyond 10 years; usually this will require purchase of long maturities in recessions and shorter maturities in booms
Default risk	low-only highest grade bonds and mortgages are purchased	no necessary amount-depends on estimates, yields and preferences	no necessary amount-depends on estimates, yields and preferences
Trading (sales)	low-small sales percentage, long holding period of securities sold	large-if company lengthens maturities by selling short maturities, otherwise small volume of sales Motivation of sales-to lengthen maturity	variable-if a cyclical sales policy is followed to increase trading yield, then large sales in low interest periods large-if a continual sales policy is followed motivation of sales-to increase maturity yield and/or trading yield (capital gains)
Liquidity	moderate balance-of constant size	small balance-of constant size	moderate and stable-if held as a transactions balance for trading variable-if held as a speculative balance
Cyclical Policy	no cyclical policy is practiced	no cyclical policy is practiced	if a cyclical policy is followed, sell long maturities during low interest periods, purchase long maturities during high interest periods; normally, the practice of cyclical policy and "following" the yield function are incompatible objectives

For these reasons the actual holdings of the portfolio assets will be referred to only occasionally.

The four companies studied were chosen to obtain a partial representation of the insurance industry in relation to geographic location, age, size, rate of growth of company, and the mutual or stock organization of company. The companies are designated as companies A through D in ascending order of asset size. There is no secrecy about the companies' identities since the source Schedules[1] are public documents. The company names will be sent on request.

Acquisitions are defined as the par amount[2] of all securities purchased during a year by one company. Disposals are defined as the amount of cash[3] received for all repayments of principal for any reasons such as maturity, call redemption, sales, prepayment,[4] etc.

Information describing each bond held by the companies was coded onto IBM cards so that the information obtained concerning bonds is extensive and rich in detail. The most crucial missing piece of information is default risk. No measurement of this is ventured by the companies and none is ventured in this study. Information concerning mortgages and equities relates only to the aggregates so that detailed analysis of these investment assets is not possible.

The life company investment process may be viewed as the yearly exchange of a Disposal package of yield and maturity for an Acquisition

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1. These Schedules are the source of almost all data used in the study. They are called Supporting Schedules or Commissioner's Schedules and are submitted along with the annual statements which give the income and reserve information. Because a standardized report form is required by all states, comparability of the data is not a serious problem. The computation system utilized was the IBM 650 of the Yale University Computation Center.

2. The unit of measurement for all computations is the par amount of par unit. A security purchased for $80 with a par value of $100 is added into the yearly Acquisition total as $100. The actual price paid influences only the calculated maturity yield.

3. Disposals are also measured in terms of par units. A prepayment of $70 on a security which cost $700 and has a par value of $800 is added into Disposals as $80. Calls, Sales, etc. are also converted to par equivalents.

4. Prematurity payments, called prepayments, come in assorted options, sizes and colors. They have developed in diversity since the war primarily in the corporate sector where direct placements have facilitated this personalized arrangement. The securities contain clauses which specify the terms and options of prepayment. These state the extent to which any one year's amortization payments may be increased, whether payments must be increased if profits increase, for how many years payments can be increased, whether "balloon" repayments exact penalty interest charges, etc.

package of yield and maturity. Given the existing market prices and rates, ideally the theory should predict both the size and the content of the two packages.

The relation of the theory to the portfolio data is facilitated by constructing an outline of the investment decision. The summary statistics for each company are then presented in a form that is comparable to the decision outline. Each decision at one level is related to and interdependent with decisions at other levels, thus this sequential decision outline is an artificial structure used only for convenience of analysis.

An Outline of the Investment Decision

I. Changes in the portfolio through decisions of the life company.

A. Decision on the volume of Acquisitions. Should Acquisitions be equal to normal cash flow (premium income and investment income) or should additional cash flow be generated through security sales to further increase Acquisitions? This decision and decision B are made jointly.

1. The Asset Distribution Decision—What is the correct allocation of Acquisitions among bonds, mortgages, and stocks, given the result of decision A?
2. The Bond Distribution Decision—What is the correct allocation of bond acquisitions among the industry-bond categories, given decision A-1?
3. The Liquidity Decision—How much Liquidity should be obtained or retained?

B. Decision on the volume of Disposals. How many sales should be made, either to

1. Increase cash flow, trade for cash flow or
2. Take trading profits, sell to achieve attractive holding period yield.

II. Changes in the portfolio not within the control of the life company; the cash flow generated by call redemptions, increased prepayments, etc.

A summary of the statistical results is given in Summary Tables A through D. The tables are designed to be read in a horizontal sequence similar to the decision outline.

The left side of the tables, columns 1 through 7, presents a quick overview of the year's investment operations: the volume of Acquisitions (column 2), a partial description of the asset distribution (column 1), the effect of calls (column 3), liquidity held (column 4), and the mean Disposal and Acquisition packages (columns 6 and 7). Maturity yield is always given

first and is separated from calendar year of maturity by a diagonal bar, as 3.9/59. The package in reality contains a third dimension, default risk; this is even more difficult to quantify than maturity[1] and no estimate is given. The two figures in column 7 attempt to measure the "cost" of the trade.[2] The first shows percentage appreciation of capital value and is defined as change of capital value (sale price minus cost) as a percentage of cost. It is useful as an indicator of return when the holding period is short. But since it provides no measure of opportunity yield, another statistic is necessary, trading yield. This is given to the right of appreciation and is defined as holding period yield minus maturity yield. These yields are further discussed below.

The right side of the Summary Tables, columns 8 to 19, shows the allocation and origin of the two cash flows among bond categories; the percentage share of the flow is shown in columns 8, 11, 14, and 17. The data describing the Acquisition and Disposal packages for each bond category are also given. Figures are given only for the most important bond categories, therefore the percentages will not necessarily add to 100 per cent. The appreciation and trading yield statistics usually refer only to sales, even if sales are only a small portion of the Disposal flow for that bond category. The percentages in the upper-right of each category cell give the causes of Disposals if they are other than sales.

It is apparent what constitutes a lengthening of maturity: the remaining maturity of the asset sold is less than the maturity of the asset purchased. It is not so apparent what constitutes a gain of yield. This depends on the relevant yield alternatives. This can be explored by distinguishing four different yields, three relate to the original asset and one relates to a new asset.

First, there is the original maturity yield y_m computed from coupon interest rate and purchase price, assuming that the change of capital value (par - cost) is distributed equally among the years to maturity. This is the yield given on the Summary Tables to the left of the vertical bar in the Acquisition and Disposal packages.

Second, there is the holding period yield y_{hp} which is realized if the asset is sold at some point of time between purchase date and maturity date. This yield is computed using the same coupon rate but a new change of capital value (current sale price - original cost) which is assumed to be distributed equally among the number of years the security has been held, the holding period. The positive or negative difference between the yield realized by selling before maturity y_{hp} and the original maturity y_m is

1. Listed maturity of a security is used because the more meaningful concept, expected maturity, is very difficult to derive. Data relating to prepayment and call options are not available and any arbitrary adjustment is misleading for any short period of time.

2. The term trade is used to include all forms of Disposals and not just sales.

defined as the trading yield y_t; this yield is presented in the Summary Tables to the right of Appreciation.

Third, there is the current maturity yield y'_m on this same asset; this is the yield which an investor would make by buying the asset at the current price and holding it until maturity. It is also the yield the current holder will make, his opportunity yield, if he holds to maturity. This yield is computed using the same coupon rate and the existing, prospective change of capital value (par - current market price). These last two yields represent answers to the following questions: What is the realized yield if a sale is made now? and What would be the realized yield to anyone who currently purchased the asset and held it to maturity? It is obvious that an interim sale and repurchase does not change the original maturity yield if the asset is subsequently held to maturity. If holding period yield to the current date is less than original maturity yield, then the yield on the asset from the present to maturity must be larger than the original maturity yield. That is, if an asset purchased below par has a y_m of 3.10 per cent and a maturity of 20 years, and this same asset is selling below par five years later with a holding period yield up to that date of 2.65 per cent, it follows that the current maturity yield y'_m must be sufficiently above y_m, say 3.25 per cent, to make the total yield over the twenty years equal to 3.10 per cent. Knowing any two of the three yields, the third can be found because the weighted sum of holding period yield and current maturity yield must always be equal to the original maturity yield.[1]

Fourth, there is the maturity yield y''_m on some newly issued security at the time the old security is sold.

The purpose of presenting the interrelationships between these different yields is to isolate the correct yield alternatives at the time an asset is sold. The two alternatives are: (1) do not sell the security, thus obtain the current yield to maturity y'_m on the old asset and forego purchasing

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1. Let the holding period be designated by hp and the time remaining to maturity as tr, then the following linear approximation describes the relationship:

$$y_m = \frac{hp(y_{hp}) + tr(y'_m)}{hp + tr}$$

where hp + tr = original maturity, and

y_m = original maturity yield
y'_m = current maturity yield
y_{hp} = holding period yield
y_t = trading yield = $y_{hp} - y_m$

these relate to the same security viewed over different periods of time at different market prices

y''_m = acquisition maturity yield — this relates to some new asset available in the market at the same time the y_{hp} and y'_m for the old asset are computed.

some new market asset with a new maturity yield y''_m; (2) purchase a new market asset with acquisition maturity yield y''_m and thus sell the old asset foregoing the remaining maturity yield y'_m on that asset. In this study when the motivation for a sale is analyzed, one of the tests used will be a comparison of y'_m with y''_m.

Since y'_m is not given in the Summary Tables it will be helpful to know under what conditions it will be sufficient to compare only y''_m and y_m to determine if trade increased yield. The two conditions are as follows. When trading yield is positive and new yield is greater than original maturity yield of old asset, there is necessarily a gain of yield; that is, if $y_{hp} > y_m$ and $y'_m < y''_m$, then necessarily $y'_m < y''_m$, hence a gain of yield. The other conditions of determinancy and indeterminancy are not given because they are not relevant to data encountered.

Within the study maturity is divided into 10 quinquennial classes designated by K's (not shown in the Summary Tables). Each K class includes 5 years with the subscript denoting the particular five year period. For example, K_0 represents all securities having maturities from 1 to 5 years in the future from the current date; K_1, all having maturities from 6 to 10 years in the future; and K_9, those having maturities beyond 46 years in the future.

Company A

Company A, a stock company, is the smallest of the companies studied and one of the fastest growing companies in the country. Its assets were 160 million in 1946 and are now over 700 million; this is a 340 per cent increase compared to an industry average of only 100 per cent. Portfolio management policies appear extremely consistent throughout the period. The company is known within the industry for its aggressive sales policy and its very active investment policies.

Investment Objectives. From the portfolio analysis it is concluded that this company invests as if the following directive were followed: a diversified bond portfolio should be maintained and mean portfolio maturity should normally be longer than 20 years. Sales and purchases should be actively utilized whenever portfolio yield can be increased without invalidating the maturity and diversification restraints. In order to carry out this trading policy, a liquidity position of short maturities must be maintained. Thus, as will be shown, this company invests as if it were maximizing expected yield subject to maturity, diversification and liquidity constraints.

Distribution of Assets. Graph A-1 shows the allocation of funds among mortgages, bonds and stocks in the upper half and among bond categories in the lower half. Both graphs indicate an unusual condition shared by few United States life companies in 1947—the distribution of assets inherited from the wartime period was an acceptable distribution or allocation even in the postwar period. That the portfolio was in balance in 1947 can be inferred from the policy of the ensuing years in which all assets were increased and none decreased. Governments were not sold, but were slowly increased throughout the period. The bond-mortgage composition reveals

SUMMARY TABLE – COMPANY A

Notes: y_m = original maturity yield, $y_{hp}-y_m = y_t$ = trading yield
App = Appreciation = change of capital value of securities sold
y_{hp} = holding period yield of securities sold
Acq = Acquisitions of bonds, Dis = Disposals of bonds
Liq = Liquidity, average daily holding
Percentage structure of Disposals – S = sales, C = calls, pp = prepayments, M = maturities
if not indicated Disposals are calls
n/a = not available

	Cash Sales Calls Liq Turnover					ALL BONDS		GOVERNMENTS			POL SUBDIVISIONS			PUBLIC UTILITIES			INDUSTRIALS		
	(1) Acq Dis	(2) Sales Bonds	(3) Calls Bonds	(4) Liq. Bonds	(5) Bonds Dis	(6) Dis Acq	(7) App, $y_{hp}-y_m$	(8) % of Acq	(9) Dis Acq	(10) App, $y_{hp}-y_m$	(11) % of Acq	(12) Dis Acq	(13) App, $y_{hp}-y_m$	(14) % of Acq	(15) Dis Acq	(16) App, $y_{hp}-y_m$	(17) % of Acq	(18) Dis Acq	(19) App, $y_{hp}-y_m$
1947	185	15	3.8	5.4	5	1.6/60 2.5/65	76S +.4,+.5	61 75	1.6/60 2.3/64	+.8,+.4				19 21	3.0/62 2.9/67	+.9,+.5	13 3	4.0/54 3.0/72	100C +.4
1948	180	43	2.1	8.5	2	2.1/62 2.7/60	95S 0,+.1	85 48	2.0/61 2.0/53		27	2.8/62		9 10	3.3/73 3.4/79	60C 0,+.9	4 13	3.0/63 3.4/68	50C,50S
1949	68	59	1.2	15.0	2	2.1/58 2.4/74	97S +.6,+.4	60 60	1.5/52 1.8/57	+.6,+.2	14 21	2.8/62 3.1/78	+1.7,+.6	12 5	3.1/71 3.0/79	+1.1,+.4	14 11	2.9/71 3.5/68	+1.1,+.6
1950	117	49	.4	4.4	2	2.6/64 3.3/77	92S +2.0,+1.1	50 29	2.0/56 1.9/56	+.5,+.1	30 41	3.2/72 3.9/84	30C +3.6,+2.5	10 3	3.0/74 3.4/77	+2.6,+.9	9 7	2.5/71 3.5/68	5C +3.9,+2.7
1951	144	30	1.9	6.7	3	2.6/65 3.0/76	79S +.2,+.2	72 54	2.2/56 2.5/65	84S -.1, 0	15 16	3.5/77 3.9/83	30C +2.0,+.9	4 16	1.9/62 3.3/76	70C +.7,1.2	6 11	3.7/60 3.6/74	+.3,+.8
1952	27	9	2.3	4.0	5	3.0/61 3.4/69	40M,47S +1.6,+1.0	52 26	2.2/53 2.2/55	39S,60M +.8,+.1	21 13	4.0/74 3.9/74	30C +3.8,+1.7	12 36	2.7/75 3.5/77	70C +1.5,+1.3	9 20	4.4/59 4.2/69	5C +5.0,+2.3
1953	253	25	0	4.1	4	3.3/65 3.6/75	91S +1.3,+.8	45 20	2.6/56 2.8/62	92S +.2,+.1	24 6	4.0/75 4.9/77	+2.3,+.8	15 45	3.1/72 3.6/82	+3.0,+2.5	9 16	3.8/74 3.9/74	+1.2,+1.1
1954	181	15	8.0	.9	4	3.5/75 3.1/80	57S,31C +2.8,+1.2	21 13	1.8/56 1.6/58	72S,27M	21 4	4.2/87 3.6/74	+3.7,+1.1	36 41	3.7/81 3.2/83	66C +1.9,+.9	18 13	4.0/70 3.6/74	40C +5.9,+2.3
1955	148	20	2.5	3.8	4	3.4/75 3.1/79	84S,10C +1.5,+.3	33 37	2.7/65 2.5/75	+2.0,0	9 4	4.4/81 3.9/84	30C +1.1,.09	21 29	3.6/80 3.4/85	30C -.1,+.2	17 9	3.6/74 3.5/74	+.4, 0
1956	207	17	1.1	4.3	5	3.6/72 3.9/76	89S 0,+.3	33 20	3.1/60 3.4/58	-.6,-.1	5 2	3.3/64 4.4/75	-1.9,-.3	35 37	3.7/82 3.9/85	8C +.3,+.5	15 19	4.1/71 4.2/72	22C +1.8,+.9
1957	290	7	1.9	5.3	7	4.0/63 4.7/74	45S,41M +.4,+.5	69 26	3.4/58 4.0/60	50M, 10C	6 6	6.1/72 4.4/81	50M -.3,-1.0	8 32	4.9/83 5.0/86	+1.4,+1.3	11 31	4.8/72 5.0/74	33C

Notes: App = Appreciation = change of capital value of securities sold
y_{hp} = holding period yield of securities sold
Acq = Acquisitions of bonds, Dis = Disposals of bonds
Liq = Liquidity, average daily holding
Percentage structure of Disposals – S = sales, C = calls, pp = prepayments, M = maturities, and E = exchanges
if not indicated Disposals are calls
n/a = not available
y_m = original maturity yield, $y_{hp}-y_m = y_t$ = trading yield

SUMMARY TABLE – COMPANY B

	Cash Flow		Sales	Calls	Liq	Tum over	ALL BONDS		GOVERNMENTS			POL SUBDIVISIONS			PUBLIC UTILITIES			INDUSTRIALS		
	(1) Acq	(1) Dis	(2) Bonds	(3) Bonds	(4) Bonds	(5) Dis	(6) Dis Acq	(7) App, $y_{hp}-y_m$	(8) % of Acq	(9) Dis Acq	(10) App, y_{hp}	(11) % of Acq	(12) Dis Acq	(13) App, $y_{hp}-y_m$	(14) % of Acq	(15) Dis Acq	(16) App, $y_{hp}-y_m$	(17) % of Acq	(18) Dis Acq	(19) App, $y_{hp}-y_m$
								21C, 75S									100C			
1947	131		6	2	0	12	2.5/63 2.9/72	+2.3,+1.1	75 26	2.2/64 2.5/68	+2.3,+.5				25 50	3.2/65 3.0/77		23	2.9/65	·
								92S						50M,37S						
1948	85		16	1	0	6	2.4/68 2.8/72	+.3,+.1	96 26	2.3/69 1.6/52	+.2,+.1	3 8	4.4/63 3.2/74		47	3.2/77		16	3.6/60	
								20M,71S						50M			83C			45S
1949	197		7	1	1.7	9	2.1/59 2.8/72	+1.4,+.6	79 10	1.7/56 1.3/50	+1.0,+.2	6 17	3.8/75 2.9/78		8 46	2.9/71 2.9/77	-.7,.0	4 22	3.1/57 3.1/64	-.25, -.3
								18C,79S						75S,20M			80C			25S, 50C
1950	44		15	4	0	5	2.6/66 3.0/74	+2.3,+.6	67	2.3/64	+1.8,+.2	10 11	3.1/71 3.0/71	+2.8,+.3	15 63	3.1/72 2.8/79		7 22	3.2/63 3.5/65	+2.8,+.4
								94S						30S,67M			94S			70S
1951	97		49	1	.2	2	2.8/69 2.9/73	-.5,-.3	90 59	2.6/69 2.8/74	-.5,-.15	12 1	4.0/63 3.3/66	+.9,n/a	4 16	2.8/72 3.4/77	-1.9,-.3	6 16	3.1/62 3.6/68	-.8,-.4
								28C,65S						25S			10C,90S			60C,33S
1952	180		6	3	0	11	3.2/65 3.6/73	-1.3,-.2	30	2.7/65	-2.2,0	18 7	4.4/60 3.2/65	+2.4,n/a	21 28	3.0/71 3.5/79	-2.1,-.1	28 52	3.6/57 3.7/74	0,-.6
								20M,75S						25M,55S			94S			20C, 61S
1953	140		15	1	.3	5	2.8/64 3.2/70	0,-.1	76 46	2.5/64 2.5/64	-1.9,-.2	3	4.5/55	+7.6,+1.0	6 11	3.0/72 3.9/79	-4.5,-.5	13 27	3.5/64 4.0/71	-1.7,-.7
								47C,40S						70C			45C,45S			60C,33S
1954	191		3	9	.9	12	3.5/68 3.4/79	+1.8,+.4	11	2.8/65	+3.3,+.3	11	4.0/64 3.1/83	+1.7,-.4	30 36	3.5/76 3.3/82	+2.3,+.2	41 31	3.7/64 3.7/71	+1.4,+.4
								23M,66S						25S,25M			80S			30S,33C
1955	120		13	2	.8	5	2.9/67 3.3/75	-1.4,-.1	65 62	2.5/66 3.1/76	-1.9,-.3	2 6	4.1/59 3.3/83	+1.8,-1.5	12 10	3.0/78 3.5/81	-2.3,-.3	19 21	3.8/66 4.0/67	+1.7,0
								18M,19C,56S			15C			40S,35C,25M			90S			10M,30C,37S
1956	175		4	1	1.1	13	3.4/74 4.2/74	-1.6,-.3	32 2	2.8/76 3.8/77	-.7,-.2	7 19	3.6/75 4.1/88	+2.7,+.4	26 5	3.1/78 3.8/84	-2.7,-.6	33 62	4.1/69 4.3/70	-1.6,-1.0
								13M,13C,70S									70S			15S, 50C
1957	190		7	1	.6	10	3.0/68 4.1/72	-4.6,-.3	67 34	2.5/67 3.1/70	-4.6,n/a	3	4.9/72		9 8	3.3/77 4.5/66	-7.5,-.5	19 37	4.4/62 4.9/71	-5.2,-2.2

Notes: App = Appreciation = change of capital value of securities sold
y_{hp} = holding period yield of securities sold
Acq = Acquisitions of bonds, Dis = Disposals of bonds
Liq = Liquidity average daily holding

Percentage structure of Disposals – S = sales, C = calls
pp = prepayments, M = maturities, and E = exchange
y_m = original maturity yield, y_{hp}-y_m = trading yield

SUMMARY TABLE – COMPANY C

	Cash Flow	Sales	Calls	Liq	Turn over	ALL BONDS		GOVERNMENT			POL SUBDIVISIONS			PUBLIC UTILITIES			INDUSTRIALS		
	(1) Acq Dis	(2) Sales Bonds	(3) Calls Bonds	(4) Liq Bonds	(5) Bonds Dis	(6) Dis Acq	(7) App, y_{hp}-y_m	(8) % of Acq	(9) Dis Acq	(10) App, y_{hp}-y_m	(11) % of Acq	(12) Dis Acq	(13) App, y_{hp}-y_m	(14) % of Acq	(15) Dis Acq	(16) App, y_{hp}-y_m	(17) % of Acq	(18) Dis Acq	(19) App, y_{hp}-y_m
										62S,38E,71E						85C,12E			78C,11.4E
1947	96	10	3.5	.5	4.2	2.7/67 2.9/66	+3.3,+1.1	81 45	2.6/69 2.4/63	+3.3,+1.0	1	3.1/67		7 25	3.2/64 3.0/75	+1.8,+1.1	11 29	3.4/60 3.5/62	+.8,n/a
							32E			70S,30E,41E						76E, 19S			48C,37M+PP
1948	96	35	.4	4.0	1.8	2.1/62 2.7/63	+.5, –	88 66	2.0/61 2.2/60	+.5, -.3	3	3.1/70		7 16	2.9/75 3.1/77	+3.1,+.4	4 15	3.1/59 3.3/62	+.3, –
							19E,			96S, 4C						88E,4S,4C			48C, 17S
1949	95	10	2.4	.2	6	2.7/68 3.3/67	+.2, -.2	57 6	2.4/68 .9/49	+.2, -.2	2	3.2/70		17 40	2.9/75 3.1/74	-.2, -.1	25 52	3.0/63 3.4/64	-.1, -.2
							9E			100S			50M,50S			41C,34E,21S			60C,10S,27M+P
1950	72	11	4.7	.2	5	2.8/70 3.4/69	+.8, -.2	50 1	2.5/71 2.5/62	+.8, -.1	1 6	2.9/65 3.3/71	+6.4,+1.8	23 29	3.0/75 3.2/76	-.8, -.5	25 56	3.3/63 3.6/64	+2.0,+.3
							19E			49S,35M						57E, 31S			60M+P,21C,13S
1951	84	14.4	2.5	3.7	2.6	2.5/64 3.2/64	+.2,+.1	60 36	2.2/64 2.4/60	-.1,-.3	2 2	3.0/73 3.2/80	+6.0,+1.3	13 20	3.0/74 3.3/74	–, -.1	25 40	2.9/58 3.4/61	+.5, +.2
							14E			86M, 14S			67S,26PP			52E, 38S			44M+P,39C
1952	106	4.6	6.2	2.2	3.9	2.9/62 3.7/65	-1.5, –	19 22	1.8/52 2.1/52	–, n/a	3	3.1/71	+4.7,+1.3	18 16	2.9/76 3.5/77	-4.4,-.1	59 59	3.3/61 3.9/65	-1.4,-.5
							17E			63M, 24S			50S			63E,13C,13S			46M+P,36C,13S
1953	97	4.7	3.3	2.6	4.2	2.7/60 3.6/62	-.3, -.2	51 43	2.2/57 2.4/54	-.3, –	2 2	3.0/80 3.7/83	+2.5,+.8	12 18	3.6/69 4.1/72	-1.7, -.8	34 37	3.2/60 4.2/64	-1.1, -.7
							13E			66M,28S			85C,13S			45C,27E,20S			36C,33M+P,16S
1954	95	5.8	6.3	.9	3.9	2.6/63 3.6/64	+1.1,+.7	38 42	1.3/55 1.8/55	+.8, n/a	2 4	3.1/76 4.0/91	-.2, -.1	20 15	3.4/73 3.8/76	+4.5,+3.2	38 39	3.4/65 4/3/67	-.5, -.4
							11E			83M, 17S						51S,30PP			38C,25PP,24E
1955	100	3.8	3.3	1.4	4.6	2.6/61 3.8/65	-1.2, -.4	52 51	1.8/56 1.8/56	-1.2,n/a				8 7	3.3/72 3.9/77	-1.6, -.9	39 41	3.5/65 4.5/75	-.4, -.6
							8E			53S,42M						48E,33S,19PP			62M,14C,5S
1956	94	13.5	3.0	3.5	2.3	3.5/61 3.7/62	-2.2,-.2	48 29	2.7/60 2.6/57	-2.1,-.3				7 8	3.4/73 4.0/76	-2.9, -.4	45 56	4.4/61 4.4/63	-3.2,-1.4
							14E			50S,33E						62PP,32E			69M,11PP,12C
1957	102	4.2	3.3	2.1	3.4	3.5/62 4.2/64	-.4,-.9	25 16	3.2/64 3.2/59	–, -.6				3 9	4.0/73 5.4/78	-5.5,-1.5	67 68	3.6/60 4.5/63	-4.8,-1.2

Notes: App = Appreciation = change of capital value of securities sold
y_{hp} = holding period yield of securities sold
Acq = Acquisitions of bonds, Dis = Disposals of bonds
Liq = Liquidity, average daily holding

Percentage structure of Disposals – S=sales, C = calls
pp = prepayments, M = maturities, and E = exchanges
underline of App, y_{hp} indicates Calls

SUMMARY TABLE – COMPANY D

	Cash Flow	Sales	Calls	Liq	Turn over	ALL BONDS		GOVERNMENTS			POL SUBDIVISIONS			PUBLIC UTILITIES			INDUSTRIALS		
	(1) Acq Dis	(2) Sales Bonds	(3) Calls Bonds	(4) Liq Bonds	(5) Bonds Dis	(6) Dis Acq	(7) App, y_{hp}-y_m	(8) % of Acq	(9) Dis Acq	(10) App, y_{hp}-y_m	(11) % of Acq	(12) Dis Acq	(13) App, y_{hp}	(14) % of Acq	(15) Dis Acq	(16) App, y_{hp}	(17) % of Acq	(18) Dis Acq	(19) App, y_{hp}-y_m
1947	117	6.9	1.0	0	12	2.5/60 3.0/67	-.5,-.2	79 13	2.3/61 2.5/64	-.6,-.2	6 2	3.8/49 4.1/88	100M -10.0	7 22	3.3/62 3.0/71	81C	7 62	3.2/62 3.1/65	70C 35C,50PP
1948	97	10.4	.3	.3	7	2.1/65 3.3/60	+.1,+.1	93 35	2.1/65 2.6/52	+1.4,+.4	2	2.9/50	100M	9	3.3/68		4 54	3.3/57 3.5/64	
1949	80	8.3	1.3	.2	8	2.1/53 3.5/63	+.4,+.1	85 25	1.8/52 1.0/49	+.7,+.3	2 3	2.8/49 4.5/64		2 9	3.8/61 3.2/75	50C +.7, 0	11 62	3.2/63 3.6/66	83C,16PP
1950	73	17	4.5	1.6	3	2.2/60 2.8/60	+1.4,+.2	82 56	2.0/59 1.6/52	+1.4,+.6	1 1	2.7/56 4.0/93		6 15	3.2/67 3.0/75	91C +1.5,+.3	11 27	3.2/63 3.4/67	83C +1.1,+.3
1951	96	57	1.3	8.3	1.7	2.0/58 2.8/60	+.3,+.3	96 78	1.9/58 2.2/56	+.3,+.3	2	3.3/85		3	3.2/71		4 17	3.5/59 3.8/68	51C,43M+PP 0, +.1
1952	120	3	2.9	5.0	3	2.2/56 3.2/62	-2.7,-.2	86 64	1.9/54 1.8/52	-3.1,-.4	1	4.1/54	100M	5 9	3.0/74 3.4/77	93C 0, 0	8 27	3.7/62 3.9/83	52C,37M+PP
1953	120	4	.6	3.1	4	2.5/56 4.0/61	-3.1,-.2	77 53	2.1/54 2.1/53	-3.1,-.4				1 5	3.8/61 4.1/68	16C, 83M+PP	21 42	3.5/62 4.6/69	12C,71M
1954	110	2	3.4	3.5	3.6	1.6/58 3.2/70	+3.0,+1.0	75 61	.9/55 .8/54	-.4, 0				6 6	3.9/62 4.0/74	82C 0,-.1	13 33	3.8/66 4.0/99	56C,43M+PP
1955	120	0	2.7	3.4	4.4	2.0/57 3.1/70	0, +.1	83 66	1.6/55 1.6/55	100M				2	3.7/70	11C,85PP +3.5,+1.0	15 34	3.7/68 3.7/98	74C,26M+PP
1956	120	3	2.5	2.5	4.7	2.0/58 4.1/68	-7.5,-.6	78 55	2.6/58 2.7/56	14S -7.5,-.7	2	4.4/70	28C,25S -11.0,0	3	3.4/72	38PP,58S -9.8,-9	16 45	3.5/66 4.3/82	68C,12PP -11.5,-1.4
1957	125	3	1.2	1.6	6.5	3.3/61 4.2/69	-5.0,-.1	75 47	3.1/60 2.7/57	-4.4,-.3	1	4.0/67	50S -9.1,-1.0	2	3.3/70	22C,15S -11.8,-1.1	4 52	3.8/64 4.7/79	-11.9,-1.5

a faster increase of mortgages (shorter-term assets) than bonds until 1951, and thereafter a faster increase of bonds (longer-term assets). Moreover, since 1951 mortgages have increased faster than bonds during low interest periods and bonds have increased faster than mortgages during high interest periods.

Yield.[1] Acquisition yield (Graph 1a) has consistently remained near those of Companies B and D, but increased more than B and D from 1955 to 1957. Yield on a gross basis inclusive of capital gains and losses is, however, consistently above the gross yields of the other companies. The company's policy of large sales has produced continual capital gains. The comparison of gross yields is given on Graph 5a and is discussed further under Trading.

The interrelationship of liquidity balance and Acquisition yield is strikingly revealed by comparing Graphs 1a and 2. Since the maturity yield function normally slopes upward (Tables A-2 and A-4), an increase of liquidity balance means less increase of yield than if liquidity balance had remained constant or decreased. That is, if life companies keep liquidity constant, their Acquisition yields will, as an approximation,[2] move parallel to the Baa and Aaa market yields (new issue yields). The Baa yield should act as a "ceiling" because the valuation procedures, which all the legal reserve companies operate under, do not allow amortization of securities with default ratings below Baa. For this reason companies purchase few of these riskier securities.

The three years of large liquidity balances, 1947-49, cause a very low acquisition yield. Yet in 1950 when the liquidity balance falls precipitously, the acquisition yield increases sharply to almost meet a declining Baa yield. In 1951, market Baa yields increase, but Company A's yield decreases because of an increase in liquidity balance. The inverse relationship between liquidity balance and yield is also evident in the later years, although not in 1956 or 57 because of the nearly horizontal maturity yield function then.

Maturity. Bond maturity averages 20 years and is the longest of the companies studied (Graph 5b). Yet call protection seems the weakest with an average of 2.3 per cent of bond holdings called in each year.

In 1948 the average maturity of bond holdings was quite short at 16 years (10 per cent of the bonds were liquidity assets). By 1955 the average maturity had been increased to 21.7 years (Graph 5b). This was accomplished largely by an extensive purchase of Public Utilities which averaged

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1. The new issue yields of market securities having a Moody's Aaa and Baa rating are depicted on Graph 1a. This graph portrays the cyclical patterns of interest rates as well as the generally rising trend of rates during the postwar period.

2. The distance between Baa and Acquisition yield is influenced by, in addition to liquidity, the proportion of long-term Governments purchased. For this company these are small and relatively constant (Graph A-1).

almost 40 per cent of bond allocations from 1952 to 1956 with a mean maturity date of 1982, or 28 years. To some extent, this lengthening of maturity was offset by large sales in the same maturity range as purchases (Summary Table, Columns 11, 14, and 17, also Graph 4).

The fluctuations in the maturity of Acquisitions are shown in Table A-1.

Table A-1
Maturity of Acquisitions

	49	50	51	52	53	54	55	56	57
Years to Maturity	15	21	25	17	22	26	24	20	17

The years in which the company went long before 1953 were all years in which the maturity yield function was upward sloping from K_3 through K_9[1] (the yield functions are shown in Table A-2). During 1954 and 1955 very long maturities were purchased even though shorter securities (K_3) yielded a greater return. In the last two years, shorter maturities were purchased and there was a declining yield function from K_3 through K_9. Thus 1954 and 1955 are the only two years in which the maturity of Acquisitions is not consistent with a policy of moving toward the high point of the maturity yield function (between K_3 and K_9).

Table A-2
Maturity Yields

	K_0	K_1	K_3	K_5	K_7	$K_{8 \text{ or } 9}$
47	2.0	3.0	2.6	2.7	--	--
48	1.9	2.1	3.2	3.1	3.1	--
49	1.3	4.6	2.8	3.5	3.1	3.5
50	1.6	4.9	3.3	3.1	3.2	4.0
51	2.2	4.7	3.1	3.0	4.0	4.1
52	2.7	3.6	3.7	3.8	3.3	3.3
53	3.0	4.6	3.9	3.6	5.1	4.0
54	1.6	5.0	3.7	3.1	3.2	3.4
55	2.0	5.2	3.6	3.3	3.2	--
56	3.6	4.8	3.7	4.0	3.8	3.9
57	4.1	5.1	5.0	5.0	4.0	--

Note: When yield of K_8 or K_9 is underlined it indicates that at least 5 per cent of Acquisitions were made in this long maturity category.

1. This is the relevant portion of the maturity yield function for a company

The acquisition maturities observed are consistent with the policy directive: maximize yield by choosing the maturities longer than K_3 that have the highest yield, but whenever possible purchase long-term securities. That is, purchase long maturities if the yield foregone is not "too" large.

Trading Policy. This company is unique in that during most of the postwar years the percentage flows into and out of the bond categories have been nearly equal. A large sale of Railroads has been coupled with a large purchase of Railroads. This may indicate a policy of trading within a bond diversification constraint. The policy seems to be: "buy at a discount and sell at a premium, and moreover, do this every year, not just during cyclical swings." The maturity constraint on trading activities is portrayed quite strikingly in the Summary Table (Column 6) which shows that except for one year, 1948 (to be discussed under liquidity), the maturity of Acquisitions was always longer than that of Disposals. Consistent sales of short maturities are not made, which indicates sales are not used to lengthen maturity. The trading policy is not oriented toward increasing cash flow to purchase mortgages or stocks since the cash flow ratio is almost always above 100 per cent.[1]

After 1951, short maturities were sold in 1952-53, and 1956-57 (high interest periods) and long maturities were sold in 1954-55 (low interest period). This pattern, shown in Graph 4, is consistent with a cyclical policy of sales to increase yield.

This sales policy is just one aspect of the overall trading policy of the company. The dual objectives of the policy are high trading yield and high maturity yield. The first objective is apparent in all years; the latter is evident in almost all years since trading yield is positive and y''_m (Acquisition yield on new security) is greater than y_m (Acquisition yield on original security).[2] The major trading accounts were Railroads, Public Utilities, and Industrials (see Table A-3 for a comparison of yields). The mean annual trading yield for the bond portfolio for the eleven years was +.30 and for each of the above three bond categories +.57, +.96, and +1.1. The mean holding period for bonds sold was very short, between one and two years. Thus when securities are sold, for example Railroads-1952, the Appreciation of 3.8 per cent is over a one year holding period so that coupled with coupon payments the holding period yields on many of these securities amount to ten per cent.[3] The Industrial account through years 1950-54

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which is not willing to get into very short assets since such a short position is speculative (causes too much income risk).

1. In two years this is not so. In 1949 and 1952 sales were probably made to provide cash flow to purchase mortgages or equities since only 68 and 27 per cent of bond cash flow was reinvested in bonds in the two years.

2. Cf. pages 12-14 for the derivation and definition of these terms.

3. A specific and fairly representative example of this trading activity is

shows very large trading yields and Appreciations (capital gains), again over very short holding periods. After 1951, purchases and sales of Railroads, Public Utilities, and Industrials are excellent examples of a company trading for holding period yield and maturity yield. This can be shown by examining the two situations, $y''_m > y_m$ and $y''_m < y_m$.

In most years, except those discussed below, (1) the y''_m (maturity yield on new securities) is larger than the y_m (maturity yield on old securities), and (2) the y_t is positive indicating that y_{hp} (holding period yield) has been greater than y_m so that remaining yield (y'_m) is necessarily less than the original yield y_m. Hence, given that $y''_m > y_m$ and $y_t > 0$, it necessarily follows that $y''_m > y'_m$.

For the years in which y''_m is less than y_m it is necessary to compare y''_m and y'_m to see if a gain of maturity yield has been made. In all cases, y_t is positive (Table A-3), making y'_m less than y_m,[1] and, as it turns out, less than y''_m.

Table A-3
Comparison of Yields

	Public Utilities		Industrials		
	1954	1955	1952	1954	1955
holding period	1	2	2	2	2
y_m (Original maturity yield)	3.33	3.29	3.11	3.70	3.55
y'_m (current maturity yield)	3.24	3.24	2.59	3.32	3.51
y''_m (current acquisition yield)	3.23	3.40	4.20	3.55	3.55
$y''_m - y'_m$	-.01	.16	1.61	.23	.04
lengthening of maturity	2	5	10	4	0

Thus in all cases, even where maturity yield of new purchase is

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the following: In January, 1952, Southern Pacific debentures due in 1996 with coupon rate of 2.75 per cent was purchased at a cost of $43,000. In July these securities were sold for a consideration of $46,000. Coupon interest received for the 6 month holding period was $764. Thus the percentage yield for 6 months was 3,764 divided by 43,000 or 8.8 per cent. This is equivalent to a 17 per cent yield on an annual basis.

1. If trading yield is positive, then current price is greater than purchase price and the remaining capital gain to maturity is relatively small. Therefore, current maturity yield (y'_m) is less than original maturity yield (y_m). Thus even if new Acquisition yield is less than y_m, y'_m may be sufficiently below y_m so that y''_m is larger than y'_m. The y_m's given in Table A-3 and in the Summary Tables may not be equal because the latter also includes calls, prepayments, etc.

less than original maturity yield of the security sold, a gain of maturity yield is accomplished as well as a trading profit, with very little change of maturity.

Although the dual motivation for the trading policy is apparent, it is not obvious how the company was able to turn a trading profit in each account in each year. None of the other companies has a comparable record. A conjectural explanation is that the company, in a sense, acts as an underwriter by picking up special purchases, holding and seasoning them for a year or so and then selling them to various outlets and brokers that it has developed through the years.

Liquidity. The Liquidity balance (Graph 2) averages 5.5 per cent of bond holdings over the entire period. Since Direct Placements are used less by this company than by the other companies, the high Liquidity balance does not seem explicable as a Precautionary balance.

Table A-4
Liquidity (average daily balance)

	47	48	49	50	51	52	53	54	55	56	57
Liquidity amount millions	1.5	3.4	7.0	2.3	7.0	3.2	4.6	1.2	3.8	8.0	11.8
Liquidity as per cent of bonds	5.2	8.5	15.0	4.4	6.7	4.0	4.1	.9	2.5	4.3	5.1
Cost of Liquidity (yield K_4 - yield K_0)	.6	1.0	1.4	2.0	1.5	.8	.7	1.7	1.2	.2	.6

In 1947, 48, 49, and 51, there is a possibility that the balance was used occasionally as a short-run speculative balance (see Table A-4). During these years the company probably expected higher interest rates and maintained a higher than normal liquidity balance. Three of the companies follow a pattern of large liquidity increases in 1951. This is probably a joint result of expectations of higher rates after the anticipated Federal Reserve-Treasury accord and an attempt to "backup" the large Forward Commitments made before Regulation X, a direct control on real estate credit, went into effect. However, it should be noted that the liquidity balances computed are yearly averages and the balances fluctuated a great deal during the year.

After 1951, the fluctuation of the balance is not consistent with that of a speculative balance since it is largest in high interest years and smallest in low interest years. The cost of maintaining the balance was less than for the other companies because it was held in Notes and Certificates and higher yielding Canadian Bills. The Liquidity cost, defined as yield on K_4 minus yield on K_0, averaged 1.1 per cent. After 1951, there is an inverse correlation between size of the Liquidity balance and the cost of obtaining the balance. Thus there is some indication that the size of the balance is

related to the "cost" of obtaining the balance.

The remaining possibility is that the balance is a transactions trading balance. The very high rate of sales (25 per cent of bond holdings per year) after very short holding periods (one or two years) makes this the most likely explanation of the liquidity balance for years after 1951.

Cyclical Policy. Within the asset distribution decision there is apparent since 1951 a policy of increasing bond placements during peak interest periods and of increasing mortgage placements during low interest periods. This behavior is consonant with either a policy of going long at interest peaks and short in troughs, or of placing funds into Bonds and Mortgages according to the relative rate spread. Some companies use investment rules such as: invest in mortgages when the bond-mortgage differential falls to less than .3. This type of rule would cause the investment behavior noted because mortgage rates, especially on guaranteed mortgages, have been more "sticky" than bond rates during the postwar years.

In conclusion it is interesting to ask whether, in regard to the three investment views discussed previously, the policies of this company are representative of: (a) a small, fast-growing, stock, high-income-risk company[1] investing defensively in long-term securities, or (b) a competitive company maximizing expected yield by following the maturity yield function and its expectations of future interest rate developments.

The flexible allocation of funds toward mortgages and bonds as well as the consistently high sales volume and trading yields all support the competitive viewpoint.[2] Furthermore, as the maturity discussion showed, the maturities of Acquisitions are consistent with a policy of "following" the maturity yield function to increase yield.

Yet the complete answer is not so simple. The extremely long Acquisition maturities in 1954 and 1955 are against the slope of the yield function. This is strikingly shown in the drop of mean Acquisition yield by over .5 per cent in these years; this fall is directly attributable to the policy of going long and could have been avoided by purchasing shorter term maturities. The yield on K_3 maturities was greater than the yield on K_7 maturities by .5 in 1954 and by .4 in 1955. Furthermore, the yield on Industrials (K_3 and K_4) was .4 per cent larger than the yield on Public Utilities (K_6 and K_7) in 1954.[3]

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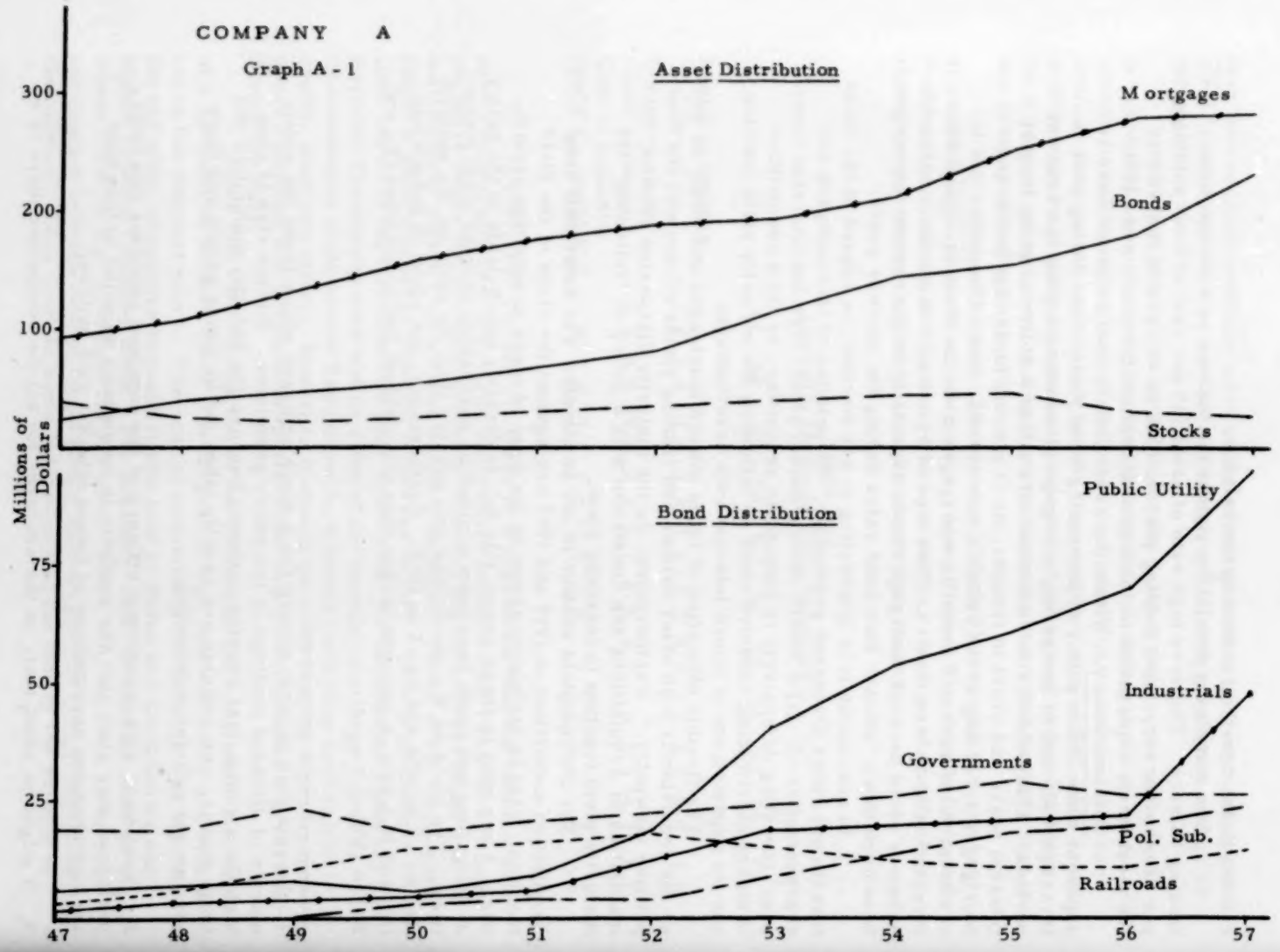
1. Income risk is most severe for a stock company which lacks the safety margin of dividend loadings in the policy premiums. Income risk is also high for a young, fast growing company because the liability maturities are long, that is, new policies are usually taken out by young people and there are few old policies outstanding.

2. Discussion with investment officers of the company confirms this interpretation; they state that the portfolio is continually adjusted to take into account changing expectations of future interest rate patterns.

3. It might be noted that, on the average, for all the companies there is a

COMPANY A

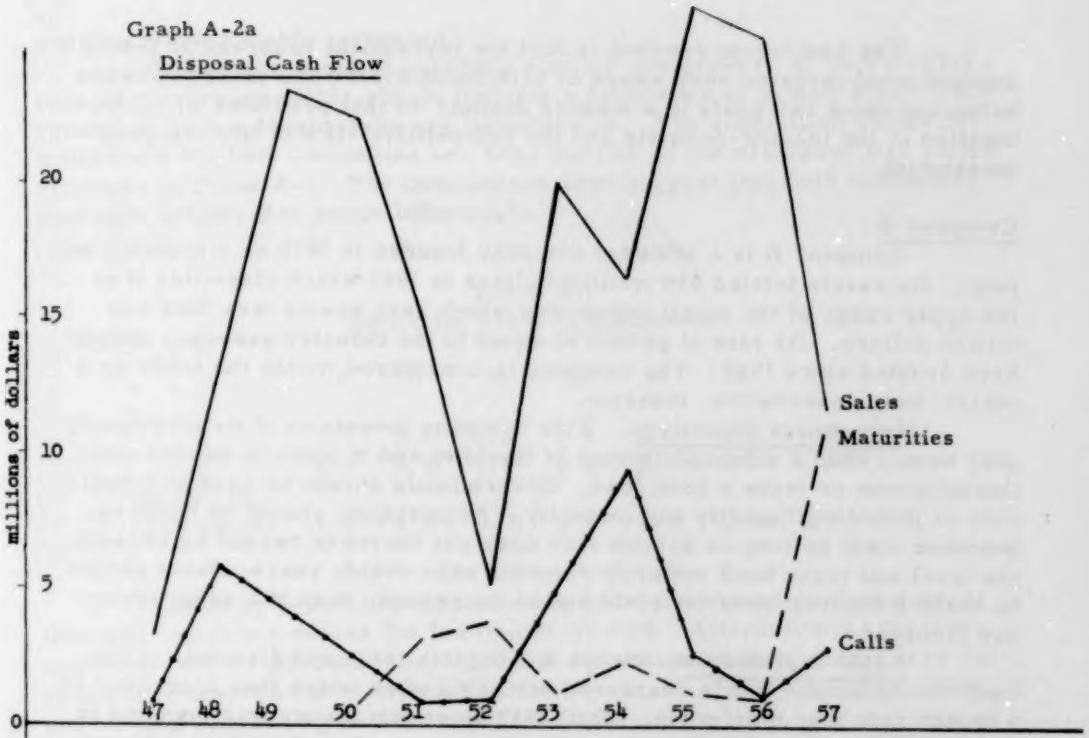
Graph A - 1



percent of bonds in K classes

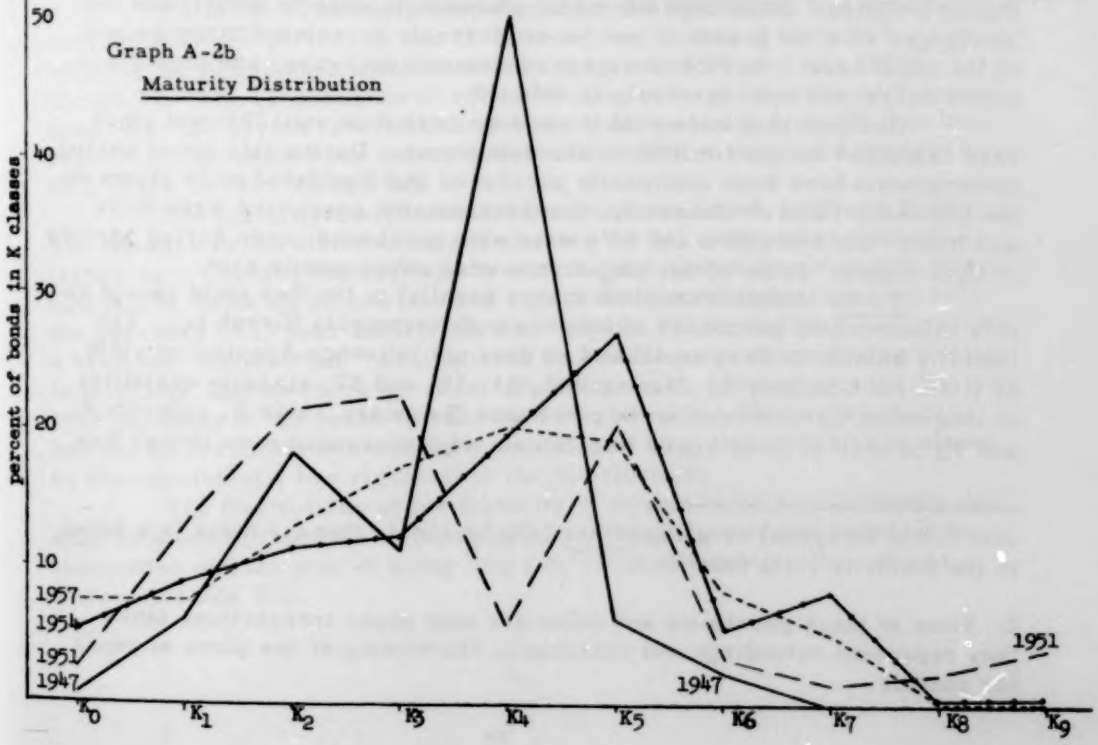
Graph A-2a

Disposal Cash Flow



Graph A-2b

Maturity Distribution



The conclusion reached is that the investment observed is that of a sophisticated investor very aware of both income-risk and yield and hence balancing these two goals in a manner similar to that predicted by a combination of the income-security and the competitive view of life company investment.

Company B

Company B is a Midwest company founded in 1879 as a mutual company. Its assets totaled 890 million dollars in 1957 which classifies it at the upper range of the small companies which have assets less than one billion dollars. Its rate of growth is equal to the industry average, assets have doubled since 1947. The company is considered within the trade as a smart, but conservative, investor.

Investment Objectives. This company invests as if its investment plan were: Hold a minimal amount of liquidity and if more is needed sell Governments or make a bank loan. Governments should be used in a dual role of providing liquidity and maturity. Acquisitions should be made to increase yield so long as default risk does not increase beyond an acceptable level and mean bond maturity remains near twenty years. Sales should be made whenever maturity yield can be increased, even if trading losses are incurred.

Asset Distribution. Graph B-1 depicts the asset distribution and bond distribution. Bonds decreased until 1951 after which they increased at a lesser rate than mortgages. Until 1949 most new money was invested in Public Utilities. After 1949 the major placements were in Industrials and Mortgages with the growth of one asset inversely correlated to the growth of the other asset. In 1955 mortgage placements increased and bond placements decreased and conversely in 1956-57.

Governments were sold to produce cash flow until 1951 and since have remained nearly constant in absolute terms. During this latter period, Governments have been continually purchased and liquidated as is shown on the Summary Table.[1] Generally, the Governments purchased were Bills and Notes, but some 83's and 95's were also purchased, even during periods of tight money. Some of the long-terms were subsequently sold.

Yield. Acquisition yield moves parallel to the Baa yield except as it is influenced by purchases of long-term Governments (Graph 1a). The liquidity balance is very small and so does not influence Acquisition yield as it did for Company A. During 1951, 53, 55, and 57, sizeable quantities of long-term Governments were purchased (Summary Table B, columns 8 and 9); in each of these years Acquisition yield decreased even though Baa

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cost (yield foregone) by going either long or short, that is, there is a hump in the maturity yield functions.

1. Some of these purchases and sales are only paper transactions since they represent refundings and exchanges, the trading of one piece of paper for another.

and Aaa market yields increased.

Companies A and B purchase similar maturities, so that a difference of acquisition yields should indicate a difference of default risk. The results of such a comparison are inconclusive. The acquisition yields on Industrials for both companies are very similar to the new issue Baa yields as shown in Table B-1. The comparison does suggest that both companies purchase largely Baa grade Industrials.

Table B-1
Industrial Yield Comparisons

	50	51	52	53	54	55	56	57
A	3.5	3.6	4.2	3.9	3.6	3.5	4.2	5.0
B	3.5	3.6	3.7	4.0	3.7	4.0	4.3	4.9
Baa yield (new issue)	3.4	3.6	3.7	4.0	3.5	3.6	4.2	5.2

Company B purchases more long-term Governments than does A; this may indicate a desire for lower default risk. Alternatively, the Governments may be purchased for liquidity and marketability. Since it is not possible to discern the motivation of the purchases of Governments, little can be said concerning default risk.

Maturity. The mean maturity date of Acquisitions has not increased over the period, it was 1972 in 1947 and it was 1972 in 1957. The mean of the Acquisition maturities for all the eleven years was 1973 (Graph 3). The consequence of not increasing year of maturity of Acquisitions over the period is a decline of mean bond maturity from 20.2 to 18.2 years. It fluctuates near twenty years until 1955 and then falls sharply to 18.2 years by 1957 (Graph 5b).

The maturity distribution of securities is shown in Graph B-2b. The changes in the distribution are similar for all companies; postwar trades have changed the portfolio from a highly peaked Governments distribution to a flattened Industrials and Public Utilities distribution. By 1951 the purchase of 15 year Industrials and 30 year Public Utilities had created a bi-modal distribution. Acquisitions thereafter were more diversified as to maturity, and the curve successively flattens out, although in both 1954 and 1957 the aging of the peaks is seen as they shift left. This aging process has not been counterbalanced by a purchase of long maturities as is shown by the consistently low right tail of the distribution.

The fluctuations of the maturity of Acquisitions are strikingly parallel to those of Company A (Graph 3). A comparison of the Acquisition maturities and the gain of going long (the yield differential $K_7 - K_3$) is shown in Table B-2.

Table B-2
A Comparison of Maturity Yield Differentials and Acquisition Maturities

	49	50	51	52	53	54	55	56	57
Maturity of Acquisitions	22	24	22	21	17	25	20	18	15
Yield K_7 - Yield K_3	0	.1	.2	.2	-.6	-.4	-.5	-.6	-.6

During most years, except 1954, the selection of maturities is consistent with a policy of "following" the yield curve—when yield K_7 is greater than yield K_3 it pays to go long and conversely. For example, the high cost of going long (.6 loss of yield) in 1953, 1956, and 1957 caused the company to choose shorter maturities of 17, 18, and 15 years, respectively.

As was the case for Company A, 1954 is inconsistent with a policy of maximizing yield by "following" the maturity yield function. In this year maturity of purchases increased sharply because of an allocation of 70 per cent of Acquisitions into non-Industrial Bonds with yield-maturity of 3.2/82 (Graph 3). The remainder went into Industrials with a much shorter maturity but higher yield, 3.7/71. This 70 per cent allocation into 30 year securities is quite remarkable and represents a strong defensive policy of increasing income security, perhaps in expectation of a downturn in future rates or as a means of reducing income risk. In addition, the relatively small 30 per cent allocation to high yield, but low maturity, Industrials is an example of a company foregoing increased yield in order to obtain increased income security. Thus the explanation of the choice of maturities for companies A and B are strikingly similar: an attempt to stay long, but a willingness to go shorter if the yield differential is sufficiently large.

The call redemption percentage of bond holdings is the lowest of the four companies, averaging 1.7 per cent per year.

Trading. The sales volume, one-half the volume of Company A, still averaged 13 per cent of bonds holdings per year. Though average annual trading yield was a respectable +.15, it will be argued that this company sold securities to increase maturity yield, not trading yield. The trading yields were positive, averaging +.6 per year prior to 1950 while after 1950 sales were made at a trading loss of about -.15 per year. The positive trading yields prior to 1951 were made on Governments purchased during the war at a discount and sold after the war during the support policy of the Federal Reserve.

In years in which trading losses are incurred, the current maturity yield, y'_m, will be larger than original maturity yield in order to make the total yield equal to original yield. Table B-3 provides a comparison of y'_m and y''_m with the change of maturity for several of the years in which trading yield is negative ($y_m < y'_m$).[1]

1. Cf. pages 12-14 for the derivation and definition of these terms.

Table B-3
A Comparison of Yields

	Public Utilities				Industrials			
	53	55	56	57	53	55	56	57
y'_m (current yield of original security)	3.3	3.1	3.3	3.4	3.7	3.5	4.2	4.5
y''_m (yield on new acquisition)	3.9	3.5	3.8	4.5	4.0	4.0	4.3	4.9
$y''_m - y'_m$	.6	.4	.5	1.1	.3	.5	.1	.4
lengthening of maturity	7	3	6	-11	7	0	0	9

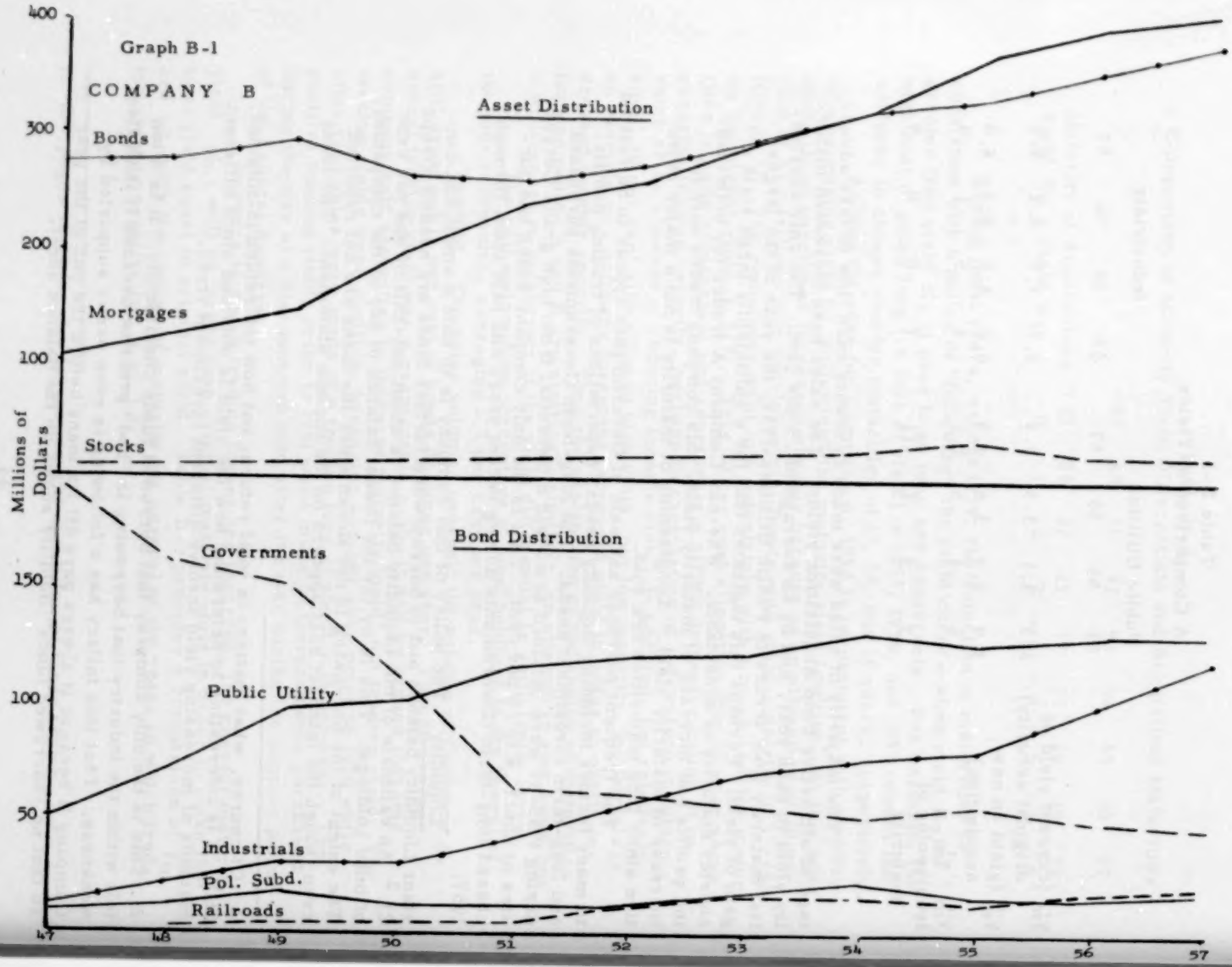
The majority of sales were made to create cash flow to take advantage of attractive bond Acquisition yields. The sales have increased maturity yield in each year, and by an average of .5 per cent. The only substantial maturity loss occurs in Public Utilities-1957, the year of the largest gain of yield. Perhaps this indicates that for a sufficiently large yield a shorter maturity is acceptable. Whereas Company A trades for both trading profits and increase of maturity yield, this company trades only for increase of maturity yield.[1] Lengthening of maturity is not a major objective since long maturities are sold.

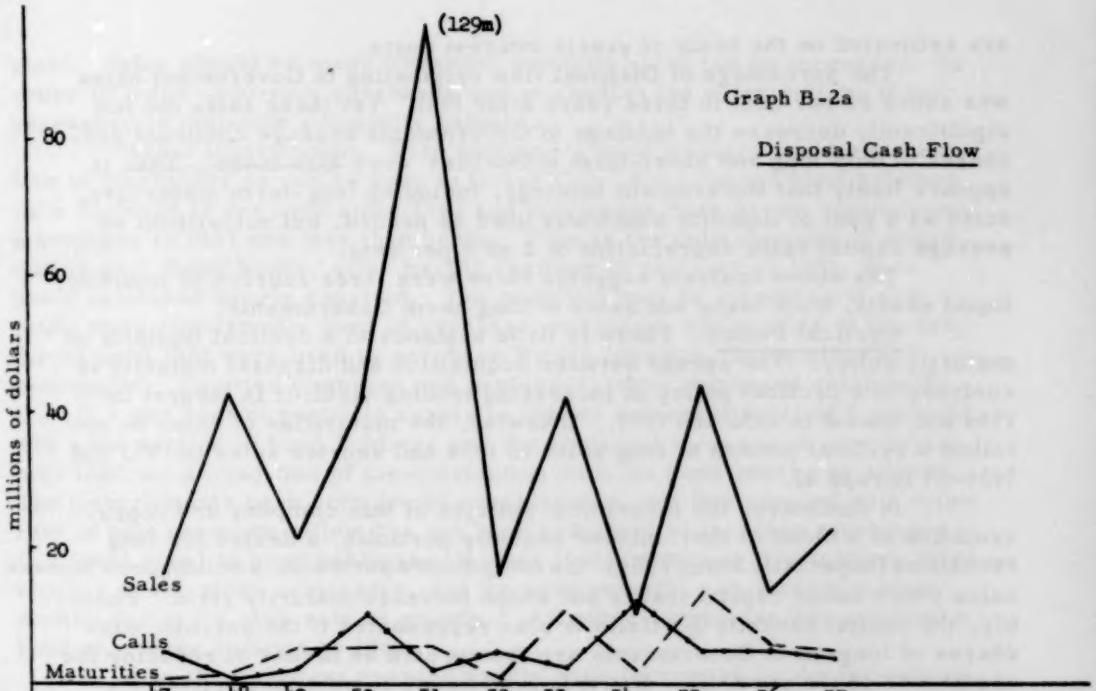
The frequent purchase and sale of Governments appear to be related to many factors including liquidity needs, expectations of trading profits, and long-term investment needs. The long-term Governments purchased during 1955-57 were obtained at a yield differential from high grade Corporates of about .4 to .5 per cent. This is the only company which had purchased long-term Governments during recent years and held them through 1957.

Liquidity. The policy of this company is to hold a small and constant Liquidity balance and to borrow when further funds are needed (Graph 2).[2] An estimate of the Liquidity balance is about one-half of one per cent of bond holdings. This is by far the lowest balance of any of the companies. The extent of the borrowing is not known since the loans are not reported even though the interest cost appears on the income statement. The loans

1. Of course, what matters is total return, not how the return is obtained. Still, it is interesting to determine how the yield is obtained since different methods of increasing yield involve different investment risks.

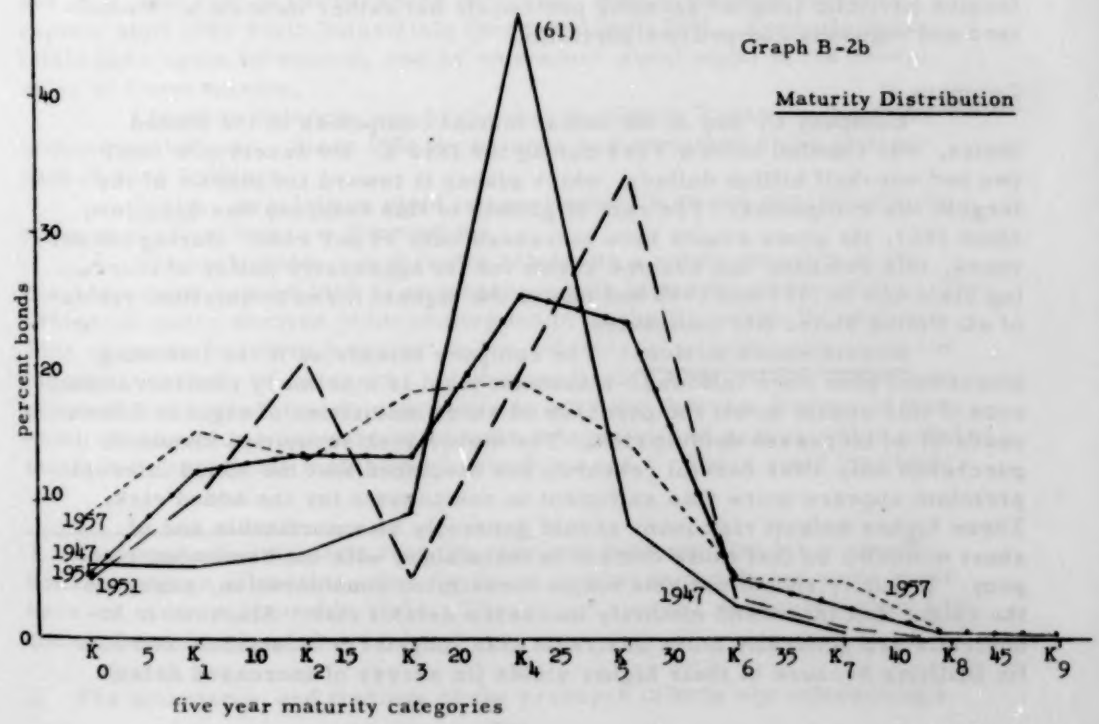
2. This is the only company that borrowed funds consistently. It is often felt within the industry that borrowing is "bad" practice because it indicates weakness. That this fallacy has a following is even partly supported by Company B because it always pays off its loans before the end of the year so that no "borrowed funds" liability shows on the balance sheet.


Graph B-1
COMPANY B
Asset Distribution
Bonds
Mortgages
Stocks
Millions of Dollars
400
300
200
100
Bond Distribution
Governments
Public Utility
Industrials
Pol. Subd.
Railroads
150
100
50
47
48
49
50
51
52
53
54
55
56
57



Graph B-2a

Disposal Cash Flow



Graph B-2b

Maturity Distribution

are estimated on the basis of yearly interest costs.

The percentage of Disposal flow originating in Government sales was above 65 per cent in three years after 1951. Yet these sales did not significantly decrease the holdings of Governments because continual purchases of both long and short-term maturities were also made. Thus it appears likely that Government holdings, including long-term maturities, acted as a pool of liquidity which was used as needed, but not without an average capital value depreciation of 2 or 3 per cent.

The above analysis suggests there were three sources of liquidity: liquid assets, bank loans and sales of long-term Governments.

Cyclical Policy. There is little evidence of a cyclical liquidity or maturity policy. The spread between acquisition and disposal maturity is contrary to a cyclical policy of increasing trading yield; it is largest in 1954 and lowest in 1956 and 1957. Likewise, the maturities of sales do not follow a cyclical pattern of long sales in 1954 and shorter sales in 1953 and 1956-57 (Graph 4).

In summary, the investment policies of this company are representative of a blend of the: income security portfolio, a desire for long securities (especially since 1954), the competitive portfolio, a willingness to make sales which cause capital losses but which increase maturity yield. Possibly, the capital security portfolio is also represented if the periodic purchases of long-term Governments are interpreted as means of reducing the credit risk of the portfolio. But it is interesting to note that neither the Acquisition yields nor the liquidity balance indicate a conservative or defensive portfolio (capital security portfolio), but rather indicate a rationalized and vigorous competitive portfolio.

Company C

Company C, one of the oldest mutual companies in the United States, was founded in New York during the 1840's. Its assets now total two and one-half billion dollars, which places it toward the middle of the largest life companies. The rate of growth of this company has been low; since 1947, its gross assets have increased only 37 per cent. During recent years, this company has become known for its aggressive policy of increasing yield and in 1957 and 1958 had one of the highest mean Acquisition yields of all United States life companies.

Investment Objectives. The company invests as if the following investment plan were followed: Maximum yield is a primary consideration, even if this should entail the purchase of short maturities of eight to fifteen years or of increased default risk. The higher risk securities should be purchased only after careful research has disclosed that the added interest premium appears more than sufficient to compensate for the added risk. These higher default risk loans should generally be amortizable and of short maturity so that close contact is maintained with the borrowing company. Maturity should not be a major investment consideration, except to the extent that increased maturity increases default risk. Short-term Industrials are generally more desirable than long-term Industrials and Public Utilities because of their higher yields (in excess of increased default

risk). Sales should be made whenever maturity yield can be increased. In order to make opportune purchases and to conduct the sales policy, it is necessary to maintain a liquidity balance.

Asset Distribution. This company's bond holdings are large relative to mortgages as can be seen in Graph C-1. Even though bond holdings have declined 15 per cent since 1947 and mortgages have grown continuously, mortgages in 1957 are less than bonds. This is the only company in which this is so. Total bonds, after having declined 14 per cent by 1951, have since remained nearly constant. The portfolio may be viewed as if new funds were consistently used to purchase mortgages while sales of Governments until 1951 were used to purchase Public Utilities, Industrials and mortgages. Equities (common and preferred) have increased continually from 1.9 per cent of portfolio assets in 1947 to a current level of 5 per cent. The slow decline of bond holdings and the continual increase of mortgages may indicate a condition of dissatisfaction with the bond-mortgage shares. The Governments have been pared considerably, but this coupled with a low rate of new premium inflow has not been sufficient to increase mortgages to a level equal to bond holdings. It is as if this company's objectives were similar to the other companies, but its achievements are viewed in slow motion due to its slow rate of growth.[1] All other companies had obtained a bond-mortgage balance by 1951.

The three fastest growing assets have increased by the following percentages from 1947 to 1957: Mortgages—270 per cent, Industrials—108 per cent, and Public Utilities—42 per cent. Public Utilities increased rapidly until 1949 while Industrials increased until 1951. Recently Industrials have again increased, and by an amount about equal to the recent sales of Governments.

Liquidity balances are held about equally in Treasury Bills and Commercial Paper. Since 1951 the balance has remained close to 5 per cent of bond holdings.

Yield. Acquisition yield is consistently high and consistently immune to cyclical interest fluctuations.

The high yields are directly related to a policy decision of the company made around 1950 to purchase certain high coupon securities. The change of policy derived from studies made by the Research Department. This company has been foremost in the industry in utilizing extensive and rigorous methods of research. At this particular time, study by the company research department in conjunction with the National Bureau of Economic Research revealed specific bond categories and grades which consistently had high yields inclusive of default losses.[2] These yield "pockets"

1. Company officials state that the company does not aim for a specific bond-mortgage allocation, that the heavy mortgage purchases were made because of their favorable yield. This is, of course, not inconsistent with the explanation given above.

2. The orientation and findings of the research efforts are interestingly

or areas were further explored and, upon the basis of the findings, efforts were made to purchase the securities.

The change in company policy is partly revealed by a comparison of market Baa yields and Industrial Acquisition yields of this company.

Table C-1
Industrial Acquisition Yields

	47	48	49	50	51	52	53	54	55	56	57
Baa (new issue)	3.4	3.6	3.6	3.4	3.6	3.7	4.0	3.5	3.6	4.2	5.2
Industrials	3.5	3.3	3.4	3.6	3.6	4.0	4.4	4.4	4.5	4.6	4.6

Prior to 1951, Industrials yield an average of .05 per cent less yield per year than do the Baa yields while after 1951 the Industrials yield an average .33 per cent more than the Baa's. (Since most of these loans are made by direct placements, a comparison with Baa market yields does not reveal their default rating.)

The constancy of the yields after 1951 is quite striking. Where small declines do take place they are caused much more by changes in the liquidity balance than they are by cyclical interest fluctuations. For example, the declines of yield in 1948, 51 and 56 are caused by increases in the liquidity balance (Graph 1a and 2). The reason for the lack of strong cyclical fluctuations may partly be due to the extensive use of Forward Commitments which are usually made at the existing market rates of interest. This may tend to smooth out and lag yield fluctuations.

Maturity. Mean acquisition maturity is short at 12.7 years. As shown in Graph 3, there is a trend of decreasing maturity from 19 years in 1947 to 7 years in 1957. In each year after 1947, the company purchases, on the average, a one year shorter maturity. The longer maturities in the earlier years were caused by the large portion of Public Utilities purchased and the decreasing maturities in recent years resulted from the increased purchase of Industrials. This general pattern of large purchases of Public Utilities to 1952 and large purchases of Industrials since then is reflected in each of the companies studied.

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revealed in this statement by one of the company officers: "On the basis of past experience it became clear that market yield differentials reflect differences in loss and cost only very imperfectly; sophisticated investors who take advantage of market imperfections can greatly improve their long term realized returns net of all costs and losses. More particularly, it has been evident that, in the past, the returns obtainable on certain higher yielding securities have not been offset by commensurately higher losses; indeed, in many instances losses have been smaller than on lower yielding securities."

The result of decreasing the maturity of Acquisitions and of selling the existing Governments is a sharp decline in the mean maturity of the bond portfolio. This uninterrupted decline of bond maturity is the most striking aspect of the portfolio (Graph 5b). This is the only portfolio in which no maturity constraint is apparently placed on purchases or sales (Graphs 3 and 4).[1] That this decreased maturity is caused primarily by the extensive purchase of Industrials is shown by the sharp peak in the K_2 maturity range on the maturity distribution graph (Graph C-3).

It seems probable that the consistent decline of maturity represents a search for higher yield, that is, a climb up the maturity yield function. This conjecture can be tested by comparing the "cost" of going long for each year to determine whether Acquisition maturity is directly correlated with the "hump" or high point of the maturity yield function. The table below indicates the K class for this company[2] having the highest maturity yield, the "hump," and the cost of going long into K_5 maturities, and the cost of going very long into K_7 maturities.

Table C-2
A Comparison of Maturity Yield Differentials and Acquisition Maturities

	47	48	49	50	51	52	53	54	55	56	57
K class of highest yield - K_{high}	2	2	1	0	1	1	3	2	1	1	3
Yield K_{high} - Yield K_5	.8	.5	.6	.7	1.2	1.2	.3	.8	.8	.5	.0
Yield K_{high} - Yield K_7	.8	.5	.7	.8	1.0	1.4	.6	.8	1.5	n/a	n/a
K class of Acquisition Maturities	3	3	3	3	2	2	1	2	1	1	1

The "hump" of the yield function has been quite short, usually between 7 and 12 years. The average cost of going long has been a .7 per

1. This statement is only a partial truth since "maturity" actually consists of two dimensions, listed maturity and call or refunding protection (which is not published in the company Schedules). Company officials stress that though they purchase shorter maturities, they always obtain fairly stringent protection against refunding. Hence the "maturity" is longer than for another company, ceteris paribus, which obtains little call protection.

2. Each company's Acquisition maturity yields are a sampling from the large population of all yields available that year. Since the companies are differentiated by location, special knowledge, personnel, etc., each company's maturity yield function of Acquisitions is different.

cent loss of yield and the cost of going very long has been .9 per cent.[1] After 1951, there is a close correlation between "hump" and Acquisition K class, except for 1953 and 1957. This steeply declining yield function beyond K_1 and K_2 is sufficient to explain why a company not concerned with income-risk would remain short at 12.7 years. It does not explain why maturity policy is inflexible (a range around 12.7 of only two years), why long maturities were not purchased in 1953 and 1957. There are two possible explanations for this inflexibility.

First, it may be that there is insufficient depth to the market in the K_6 - K_9 range, so that if increased placements were attempted the yield would quickly fall and further increase the cost of going long. While this is possibly the case in the very long maturities where only Railroads and Special Revenues may be available, it is certainly not the case for the K_5 and K_6 range of Public Utilities. It is improbable that the market is as thin as this explanation requires.[2]

Second, the overall policy directive may be to specialize and concentrate purchases in short-term Industrials, given the average declining K_2 - K_9 maturity yield structure of recent years.[3] This would explain the majority of placements since the yield function has normally penalized long placements. After the yield curve has remained shifted to an upward sloping curve for one or two years, then the premium of going long might cause a change in top policy directives.

Trading. Sales average 10 per cent of bond holdings per year and are comparable in size to those of Company B. The average annual trading yield was barely negative at -.02. Sales followed a familiar pattern: between 1947 and 1951, 3/4 of all Governments held in 1947 were liquidated without incurring a trading loss.

The primary trading accounts, Governments, Public Utilities and Industrials will be discussed in turn.

Long-term Governments were sold from 1947 to 1951 and from 1955 to 1957 to provide cash flow to purchase Mortgages, Public Utilities and Industrials. The large fluctuation in sales volume is almost entirely accounted for by the sales of long-term Governments. After 1951 Governments were used as a source of liquidity by continually selling and replenishing maturities of less than five years. Notes and Certificates purchased early in one year were sold as needed, sometimes before the end of the same year or in the next year. Long-term Governments were not purchased. Thus the Government account was used to generate cash flow to

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1. Part, but certainly not all of this difference, is accounted for by the lower default risk on long maturities. Cf. pages 61-62

2. Certainly some purchases of these maturities could have been made as is proved by the purchases of Companies A and B.

3. Also given the findings and recommendations of the Research Department in regard to default risk categories and yields.

reshuffle portfolio assets and to provide liquidity in a manner similar, though to a lesser extent, than in Company B.

Data relating to sales of Public Utility bonds are given in Table C-3. This shows a significant gain of maturity yield ($y''_m - y'_m$) in each year though the gain of maturity is always small. Thus it appears that the sales are made and capital losses sustained in order to increase maturity yield. However, this cannot be considered an intensive trading policy because the sales are only a small per cent of Public Utilities held, and furthermore, because the gain of maturity yield and the volume of sales are not closely related. For example, in 1954 in which y_{hp} is 6.6 per cent the volume of sales is no larger than in 1950-52, and 1955 when y_{hp} is less than 3 per cent. It is probable that the sales of Industrials were also made to increase maturity yield. But since this account includes commercial paper placements, it is not possible to compare y'_m and y''_m. The mean yield indicated for Industrials is slightly influenced by the much lower commercial paper rate. In the one year of very small purchases of commercial paper, 1955, y''_m equals 4.5 per cent. y_m equals 3.5 per cent, and the holding period is 5 years out of an original maturity of 14 years. The current maturity yield in this case is 3.8 per cent compared to the Acquisition maturity yield of 4.5 per cent; this is a gain in maturity yield of .7 per cent. This is trading for maturity yield.

Table C-3
A Comparison of Public Utility Yields

Year	48	49	50	51	52	53	54	55	57
Par value of sales (millions)	12.0	1.5	13.9	21.5	23.4	3.6	13.7	11.9	.5
Y_{hp}/hp	3.3/3	2.8/3	2.4/4	2.9/7	2.7/5	2.8/6	6.6/6	2.4/7	2.5/6
y_m	2.9	2.9	3.0	3.0	2.90	3.07	3.2	3.2	3.3
y'_m	2.86	2.91	3.1	3.04	2.95	3.15	2.67	3.52	3.57
y''_m	3.1	3.1	3.2	3.3	3.5	4.1	3.8	3.9	5.4
$y''_m - y'_m$	.24	.19	.10	.26	.55	.95	1.13	.38	1.83
lengthening of maturity	2	-1	1	0	1	3	3	5	5

The only other substantial trading account, Political Subdivisions, reflects a different type of trading activity. From 1950 through 1953 sales were made to obtain attractive trading profits as well as to increase maturity yield (Summary Table, column 13). The holding period averaged 3 years and holding period yield was above 4.5 per cent on a 2.9 per cent coupo- security. Trading yields decreased each year and became negative in 1954,

after which sales were terminated.

When non-Government sales are viewed over the eleven year period, it is evident from the stability of the non-Government securities sold that a conscious and consistent sales policy has been followed (Table C-4).

Table C-4
Sales Volume of Governments and non-Governments

	50	51	52	53	54	55	56	57
Non-Government Sales (millions)	23	45	52	34	41	25	28	8
Total Sales (millions)	166	201	61	64	77	50	178	54

As discussed previously, the large sales of Governments are most likely used to produce cash flow to enable purchase of attractive assets (Industrials in 1957). The small sales of Governments are probably for liquidity needs since the sales are not large enough to produce substantial cash flow to purchase new securities.

Liquidity. Before 1951 liquidity was provided by large liquidations of Governments; after 1951 liquidity was provided by scheduled maturity flows from short-term assets. This is shown in Graph C-2.[1] The following table shows the average daily holdings of: Commercial Paper, Treasury Bills, Certificates, and the total of these liquidity items.

Table C-5
Liquidity (average daily holdings)

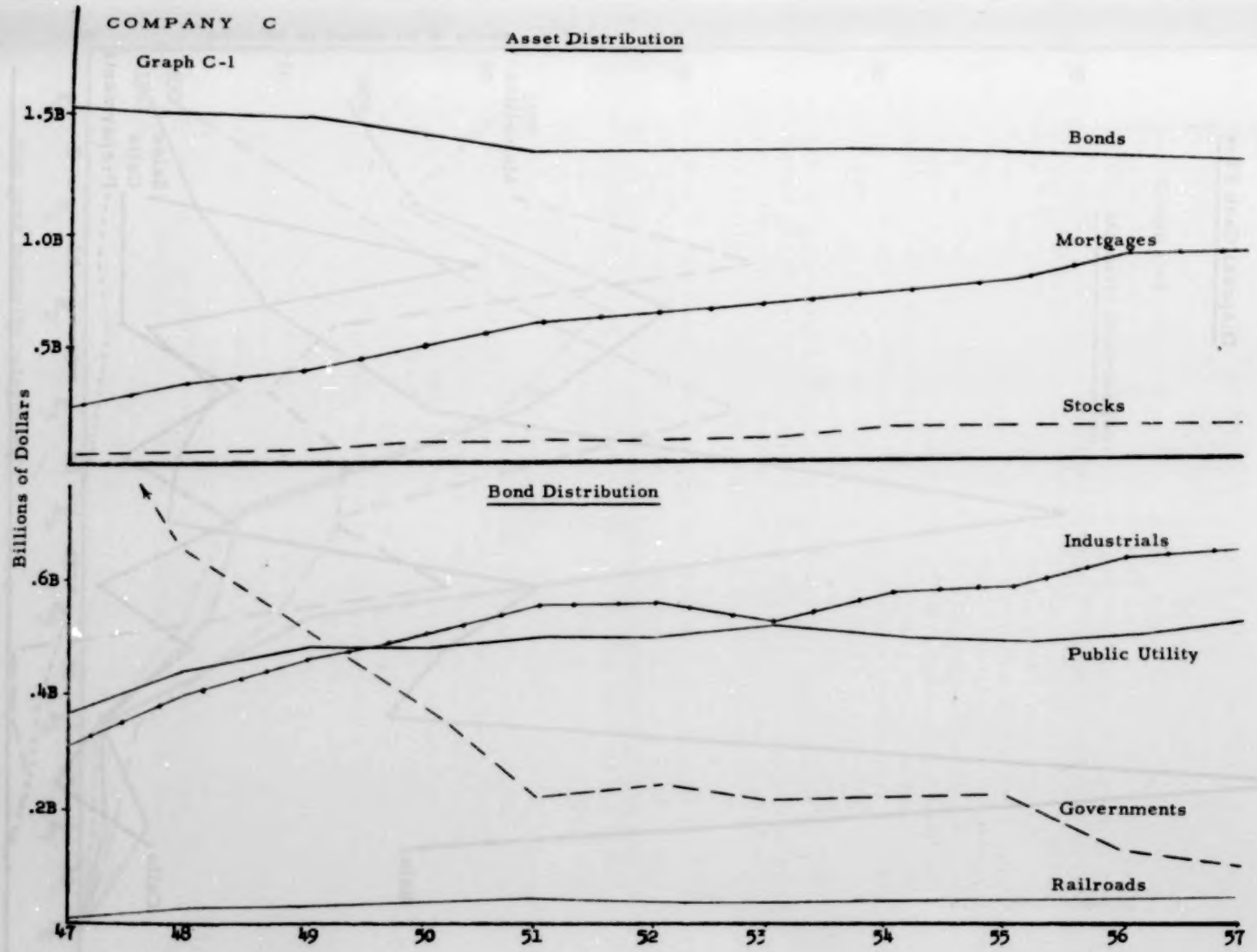
	47	48	49	50	51	52	53	54	55	56	57
Commercial Paper	--	10	2	--	29	16	13	3	0	15	9
Treasury Bills	7	50	1	--	20	9	7	6	9	9	0
Certificates and Notes	--	--	--	2	--	4	15	2	10	20	18
Liquidity (millions)	7	60	3	2	49	30	35	11	19	44	27
Liquidity as per cent of bonds	.5	4.0	.2	.1	3.7	2.2	2.6	.9	1.5	3.4	2.1

This is the only company studied which extensively utilizes Commercial Paper for its liquidity needs. The total purchases run very large,

1. The maturity flow is a relatively horizontal line after correction is made for average daily holding. For example, the large increase in 1956 is

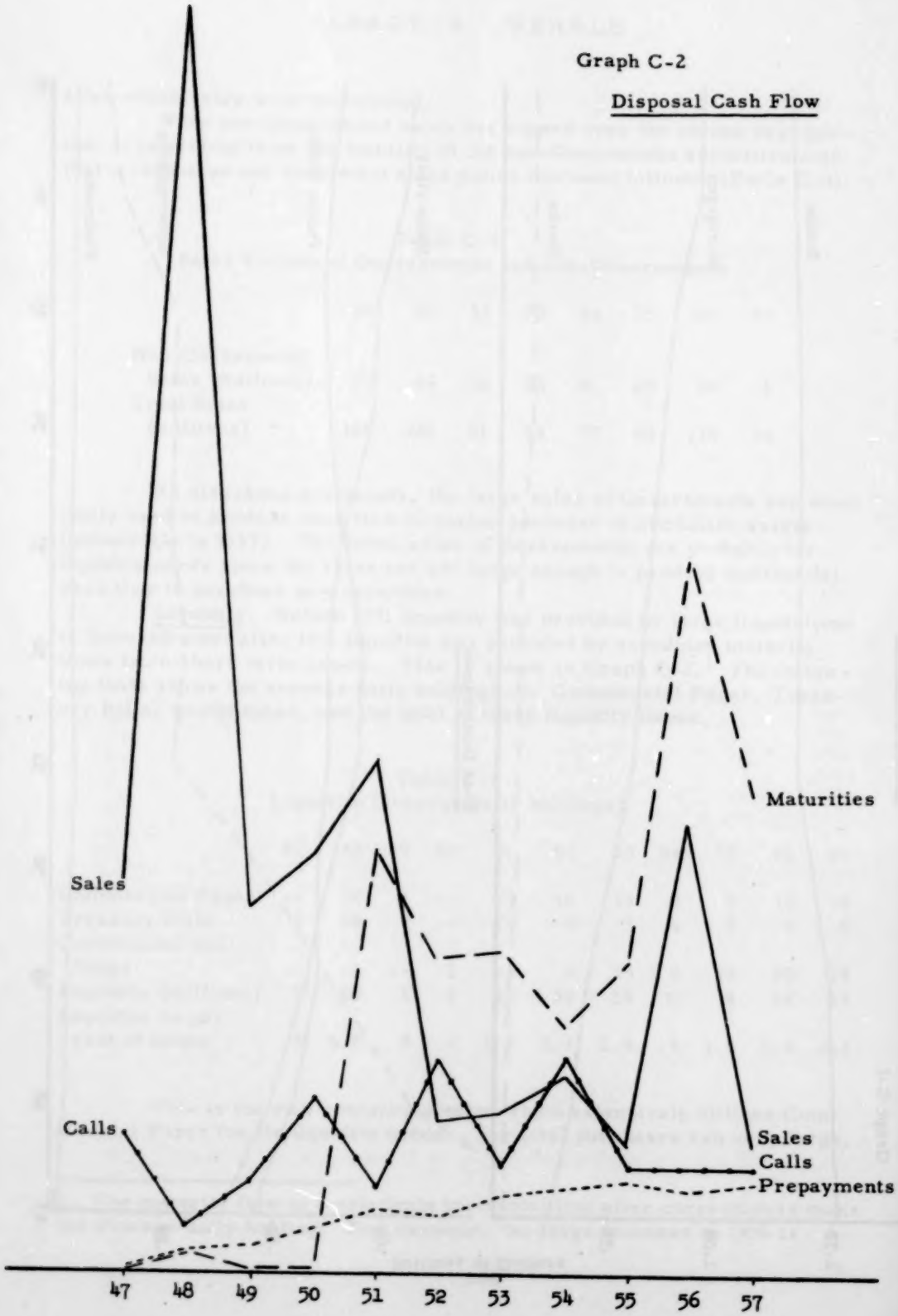
COMPANY C

Graph C-1



Graph C-2

Disposal Cash Flow

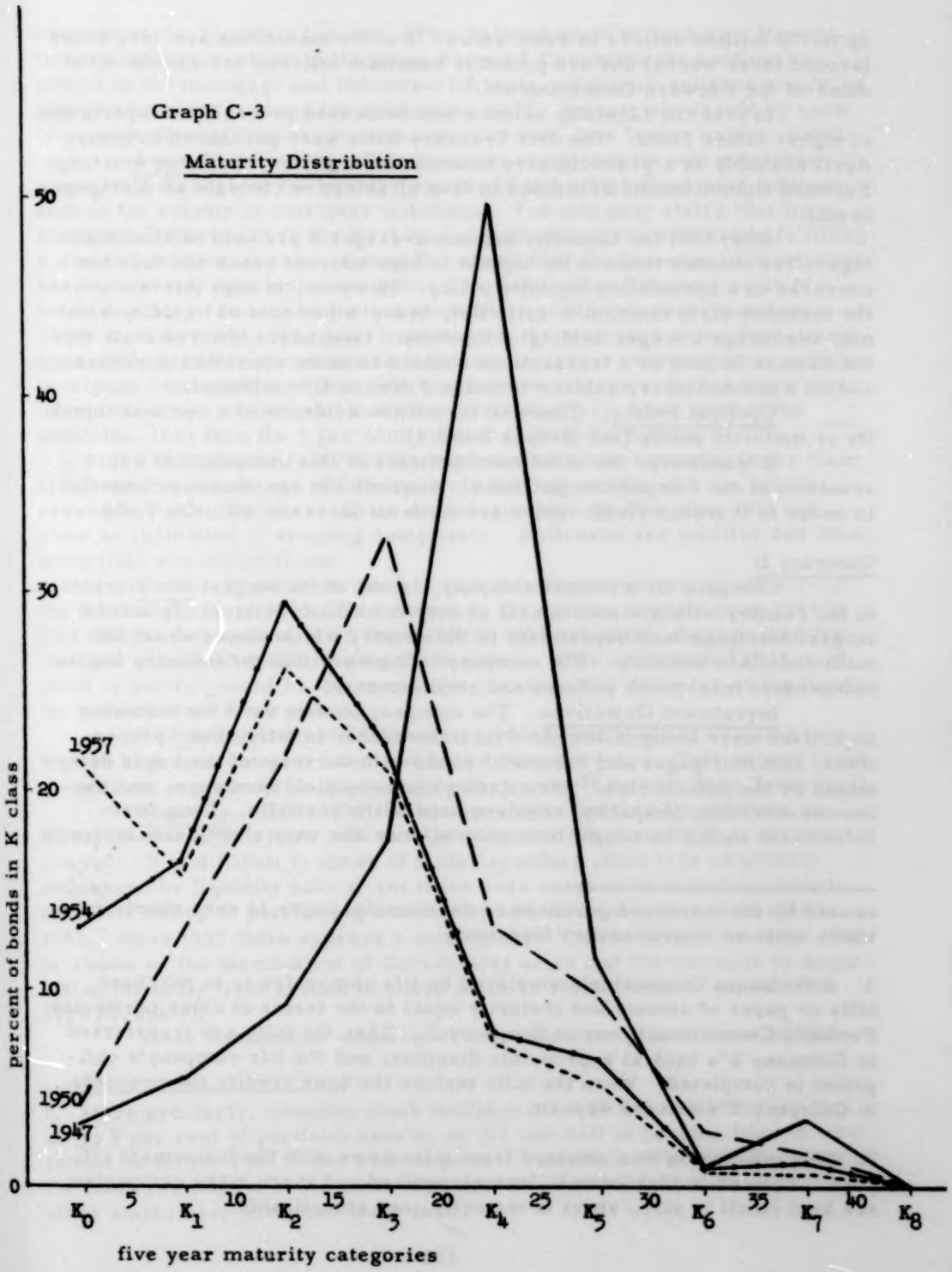


percent of bonds in K class

0

Graph C-3

Maturity Distribution



up to 150 million dollars in some years. But the maturities are very short (around three weeks) and are probably carefully tailored to coincide with some of the Forward Commitments.[1]

In 1948 the Liquidity balance was increased probably in expectation of higher future rates. The 1951 Treasury Bills were purchased in early April probably as a precautionary balance to hedge the very large mortgage Forward Commitments scheduled in fear of selective controls on mortgage credit.

After 1951 the Liquidity balance averages 2 per cent of bond holdings. The balance tends to be highest in high interest years which is the converse of a speculative liquidity policy. However, in high interest years the maturity yield function is quite flat, hence a low cost of liquidity which may encourage a larger holding of liquidity. Investment officers state that the balance is held as a transactions balance to make opportune purchases and as a precautionary balance to hedge Forward Commitments.

Cyclical Policy. There is very little evidence of a cyclical liquidity or maturity policy (see Graphs 2 and 4).

In summary, the investment policies of this company are representative of the competitive portfolio. Acquisitions are chosen primarily in order to increase yield. Sales are made to increase maturity yield.

Company D

Company D, a mutual company, is one of the largest life companies in the country with invested assets of over ten billion dollars. It has the largest mortgage loan department in the country which places about 800 million dollars annually. The company is known within the industry for its independent investment policies and requirements.

Investment Objectives. The company invests as if the following objectives were being followed: Place new funds, in fairly fixed proportions, into mortgages and industrial bonds with the term of the bonds determined by the default risk,[2] the existing maturity yield structure, and the income-certainty (maturity) requirements of the portfolio. Long-term Industrials should be sought to counterbalance the very short-term maturity

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caused by the increased purchase of commercial paper of very short-term which must be "turned-over" frequently.

1. A technique increasingly employed by life companies is to purchase bills or paper of amount and maturity equal to the terms of some particular Forward Commitment, say to Company Z. Then the bills are transferred to Company Z's bank at appropriate discount, and the life company's obligation is completed. When the bills mature the bank credits the proceeds to Company Z's demand deposit.

2. This conclusion was obtained from interviews with the investment officers. They state that loans to less recognized and more risky companies are kept small in size, short in maturity, and amortizable.

element of the Liquidity balance. This balance must be held as a Precautionary balance because of the large Forward Commitments continually placed in the mortgage and industrial markets. Primary reliance should be placed on mortgage loans for generating yield. Industrials should be used to provide diversification, income-security and, to a lesser extent, yield.

Asset Distribution. This company maintains its own mortgage sales staff throughout the country and hence has a high fixed cost independent of the volume of mortgage flotations. The company states that its Mortgage Department is the first line of fund placement with bonds fulfilling a somewhat residual role. Graph D-1 shows that the increase of mortgages has been nearly constant since 1951. The Acquisition/Disposal ratio of bonds has also remained constant since 1951, at 120 per cent (Summary Table D, Column 1). The high fixed cost of the mortgage sales department apparently justifies a constant flotation of mortgages independent of relative mortgage-bond yields. Since 1951, the bond-mortgage ratio has been kept nearly constant. Common stocks have remained at 1.5 per cent of the portfolio, less than the 5 per cent allowed in New York State.[1]

The movements within the bond portfolio are remarkable for their simplicity: an exchange of Governments for Industrials with a slight increase in Public Utilities. Sales of Governments decline after 1951 but show no indication of stopping completely. Railroads are inactive and other securities are insignificant.

Yield. Acquisition yield is significantly influenced by the size of the liquidity balance held. For example, the decline of yield from 1949 to 1951 and the increase of yield from 1951 to 1953 are much sharper than the changes of market yields during these years. This accentuated change of yield is partly caused by the respective increase and decrease of the liquidity balance over these years.

The Acquisition yield fluctuates widely and tends to be relatively high in high interest years and low in low interest years. This aspect of the investment experience is discussed further under Liquidity (see Table D-2).

Maturity. Until 1953 the bond portfolio continually shortens as Governments (1970's) are sold and liquidity and Industrials, K_3, are purchased. It is difficult to speak of maturity policy since it is so greatly influenced by liquidity policy, yet there does seem to be a distinguishable maturity policy of purchasing continually shorter maturities until 1951 or 1953. After 1953 there appears a notable shift toward long maturities. This is shown by the termination of Government sales and the increase in Acquisition maturity from around 10 years prior to 1953 to over 17 years after 1953 (Graph 3).

Mean Acquisition maturity of Industrials remained close to 1966

1. More precisely, common stock holdings must be less than the smaller of (a) 5 per cent of portfolio assets, or (b) one-half of surplus (this in turn cannot be larger than 10 per cent of portfolio assets). The New York law is the most restrictive of the State laws and it is the model after which most other states have patterned their laws.

prior to 1953, thereafter it ranged from 1980 to 1999. In each year after 1952, there was a placement of one or more 50 million, 100 year Industrial loans to the very highest grade Industrial borrowers.[1] These loans are convertible after eight years, at the option of borrower or lender, into 25 year sinking fund bonds with a coupon of 3.5 per cent. The following figures show the per cent of Acquisitions placed in K_9 maturities (longer than 45 years) in years after 1951.

51/0% 52/5% 53/3% 54/19% 55/9% 56/7% 57/8%

The cost of making these long loans can be partially measured by comparing yield K_3, the primary Industrial placements maturity, with yield K_9, the longest maturity.

Table D-1
Maturity Yields

	K_0	K_1	K_3	K_5	K_7	$K_{8 \text{ or } 9}$
47	2.2	3.9	2.8	4.0	4.0	4.2
48	.9	3.9	3.2	3.0	--	4.0
49	1.1	4.3	3.5	3.2	--	--
50	1.1	3.5	3.2	2.8	4.0	--
51	1.6	4.2	3.6	2.8	--	--
52	1.8	4.4	4.0	3.5	--	3.75
53	2.6	4.9	4.4	3.6	--	3.75
54	.9	3.1	4.1	3.8	--	3.75
55	1.6	2.5	3.8	3.3	3.5	3.75
56	2.7	4.1	4.7	4.5	--	3.75
57	3.2	5.4	4.5	4.4	--	3.75

Note: The underlined yields of K_8 or K_9 indicate that substantial placements were made in this maturity range; at least 4 per cent of Acquisitions.

The average cost since 1952 is .5 per cent. An alternative measure of the "cost" of the long placements is a comparison of mean Industrial Acquisition yields and K_9 yields; between 1952 and 1957 the Industrial yield averages .33 per cent greater than the K_9 yield. Yet neither of these measures is satisfactory because neither allows for the extremely low default risk on

1. Actually five loans were made, one each to Chrysler, Union Carbide, Olin Mathieson, Goodyear and IBM during the period 1951 to 1954. The loans were made on a Forward Commitment or package basis, some proportion of the total loan to be deliverable each year for two or three years. Thus the continuing placements after 1954 do not represent new loans, but the fulfillment of prior commitments.

the very long-term securities.

From the preceding data, especially the consistency of placements into the K_9 maturity range, it can be inferred that a conscious maturity policy was initiated after 1952. The magnitude of this shift in Acquisition maturity is shown in Graph 3. It seems likely that the very short maturity position, caused by the liquidity position deemed necessary after 1951, soon caused the portfolio maturity to fall below an acceptable level. By 1953 a vigorous policy of purchasing extremely long maturities was initiated as an offset to the Liquidity balance. Graph 5a shows that mean bond maturity had fallen by 1953 to 16.7 years, an 11 per cent decline since 1947. By 1956 mean bond maturity had been restored to 18.2 years, making up 75 per cent of the previous decline. Even though the long placements had maturities of 100 years they were treated as if their maturity were only 50 years because of the convertibility options. Were the bonds treated as 100 year maturities, the mean portfolio in 1956 would be 20.8 years. Regardless of which measure is appropriate, the increase of maturity, while maintaining a 3 per cent Liquidity balance, is impressive.

That the company had initiated a conscious maturity policy during these years is confirmed by discussion with company officials. Yet, as was noted previously, the term maturity must be interpreted broadly to include both maturity and call provisions. Investment officers state that the long loans placed after 1951 were made to obtain favorable long-term yields and to place the funds "far away in the future." Previously this company, along with most other life companies, had been partially swamped in 1944-45, '47, and '49 with large cash inflows from refundings during these low interest years. These long loans had call protection and were made to prevent a repetition of the former refundings.

It is a major tenet of this company's investment policy to obtain refunding protection on all loans for the entire life of the security. In order to obtain this protection they are willing to take a slightly lower yield and to allow the doubling of the mandatory sinking fund for any one year. One of the primary reasons this company is not willing to purchase market securities, according to company officials, is the inadequate call protection written into these securities.[1]

After 1954, with the upturn in rates and demand for funds, no more of the very long loans have been made. It is probable that the increasing K_{3-5} rates made the longer rates appear less attractive. Company officials state that an additional, and important, reason for not placing additional long loans was that they absorbed too large a proportion of investable funds. Demand for funds increased so rapidly after 1954 that the company found itself pressed to meet all the requests of its old customers. For these new placements the terms, except for refunding protection, were tailored to

1. In some cases such as Public Utility bonds, the Federal Power Commission will, for some reason, not allow what many life companies consider adequate call protection. This factor partly explains the current lack of interest in the utility bonds.

suit the needs of the borrowing companies, and maturity declined as yield sharply increased from 1955 to 1957.

The impact over the entire period on the bond maturity distribution of the Liquidity balance, the amortizable Industrials, and the long-term Industrials is a greater dispersion of the maturity distribution of bonds. This is shown in Graph D-3.

Trading Policy. Graph D-2 depicts the two different sales periods. The first period, from 1949 to 1951, is a period of sales of Governments to provide cash flow. An average of 500 million dollars of Governments per year were disposed of from 1947 to 1949. The two years 1950-51 provide a striking termination to this first period; during these two years, 3 billion dollars of Governments were sold, equal to one-half the 1949 Government holdings, as ominous rumblings of a break in the support policy were heard from Washington. This operation was conducted at a trading profit of .3 per cent. The proceeds of these sales were partly placed for temporary holding into liquidity assets (Graph D-2).

During the second period, commencing in 1951, sales dropped to 3 per cent of bond holdings, and 90 per cent of these sales were Treasury Bills and hence fall under a discussion of liquidity. The remaining 10 per cent (15 to 20 million dollars) represent a few sales of Public Utilities and Industrials each year. Investment officers state that these sales are made to eliminate low coupon securities and thus increase cash flow during periods of high interest rates. Most of the securities sold had coupons less than 3 per cent and were purchased between 1944 and 1947.

Liquidity. The cost as well as the influence on yield of the Liquidity balance have already been discussed. The pattern through time is similar to that of the other companies—prior to 1951 liquidity was available from the cash flow generated by the sale of Governments while after 1951 liquid assets were held to provide liquidity (Graphs 2 and D-2). It remains to discuss the purpose for which the balance is held. The size of the balance, though averaging 3 per cent of bond holding since 1952, is responsive to the long-term rate of interest; the high long-term interest rate in 1953 and 1956-57 seems to have caused a reduction of the Liquidity balance even though the "cost" of holding the Liquidity balance declined to the lowest figures for the period. This is consistent with a policy of placing as many funds as possible in medium and long maturities (K_3-K_9) when the current long-term rate of interest is high relative to the expected long-term rate.

From the previous description of the Liquidity balance it is clear that, except for 1951, the balance is not held for speculative purposes. For if it were held since 1951 for speculative purposes, this would entail the rather courageous withholding of funds through the 1953 high; this seems unlikely.

The Liquidity balance is most likely both a transactions balance to facilitate Acquisitions and a precautionary balance to hedge Forward Commitments. The latter is necessary because the company places annually by Direct Placement about 800 million of mortgage loans and about 600 million of Industrial loans.

Yet if the volume of Forward Commitments is inversely related to

the long-term interest rate (in periods of tight money, finding attractive loan placements is no problem), then even the previous conclusion concerning the long-term interest elasticity of the Liquidity balance is jeopardized. The balance is smaller in 1956 and 1957 because the volume of Forward Commitments is smaller.

Table D-2
Acquisitions of Industrials, Liquidity Cost and K_9 Yield

	51	52	53	54	55	56	57
Per cent of Acquisitions in Liquidity / Acquisitions in Industrials	78/17	64/27	53/42	61/33	66/34	55/45	47/52
Liquidity cost (Yield K_4 - Yield K_0)	2.1	1.8	1.6	3.5	2.0	1.6	1.2
Yield K_5	2.8	3.5	3.6	3.8	3.3	4.5	4.4

Cyclical Policy. The policy followed during 1948-49 and 51 was apparently based on expectations of increasing rates in the near future. In several of these years they purchased 1 to 5 year. 1.5 per cent, Governments while selling the longer 2 1/2 per cent Governments (1948). This is consistent with expectations of higher Industrial and Public Utility yields in the near future. Then in 1950-51 the large sales of Governments were made in expectation of the Accord. However, this is political prevision rather than cyclical policy. After this early period there are no consistent evidences of following cyclical policy based on interest expectations.

In summary, the policies of this company are oriented toward both income-security and yield.

A Comparative Resumé of Each Company

Following are brief resumés of the highlights of the portfolio experience of the companies. Only a summary of the results is given here; evidence for the conclusions is given under the relevant headings of the analysis.

The policy of Company A represents a blend of a vigorously competitive portfolio and an income-security portfolio. As was shown previously and as is depicted on Graph 5a, there is no question of this company's policy and ability of trading for yield. Graph 5a depicts gross yield inclusive of realized capital gains and losses. The difference between yield inclusive of capital gains, A, and yield exclusive of capital gains, A', is a measure of the gain from trading. These high trading yields are accomplished by a continual policy of purchase and sales of long maturities throughout the interest cycle, not by a cyclical policy of purchases and sales. This implies a policy of continually picking winners (appreciating securities) rather than benefiting from cyclical price fluctuations. Moreover,

the trading policy has substantially and continually increased the maturity yield of the portfolio. The income security dimension of the portfolio is revealed by the long mean bond maturity (the longest of any company). That the reach for income-security reduced yield is partly shown by the negative correlation between mean bond maturity and net yield after 1952.

The investment policies of Company B include aspects of the income-security and competitive portfolios. The company's liquidity policy, which utilizes bank loans and Government bonds rather than liquidity assets, is unique and increases the company's yield. The income-security demand is shown by the consistent purchase of long maturities. The competitive nature of the portfolio is revealed by the relatively large sales volume which is consistently employed to increase maturity yield. Many of these sales cause trading losses (decrease current gross yield) but increase the maturity yield of the portfolio (increase future yield).

The investment policies of Company C are representative of the competitive portfolio. They represent a competitive portfolio not because a cyclical policy is pursued but because Acquisition maturities "follow" the maturity yield function. All aspects of the portfolio experience are consistent with this interpretation. Acquisition maturity is continually short near the "hump" of the maturity yield function. Mean bond maturity continually declines throughout the period providing no evidence of a maturity constraint on Acquisitions. After 1950 Acquisition yield is consistently higher than any of the other companies (except 1956-57), and net portfolio yield has increased faster than any other company. The Liquidity balance is kept quite low.

The policies of Company D represent a competitive and income-security portfolio. It is competitive primarily because of its unique Mortgage Loan Department. The yield for this company is dominated by the favorable mortgage yields which offset the continually low Acquisition yield on bonds in the several years of large liquidity balances. Also the policy of making maximum placements into Industrials in high interest years is indicative of the emphasis placed on obtaining high yield. The policy of placing very long loans to the highest grade industrial borrowers represents an intensive income-security policy, which is probably caused by the high Liquidity balance, the large and growing proportion of mortgages (relatively short-term assets), and the previous experience with large refundings.

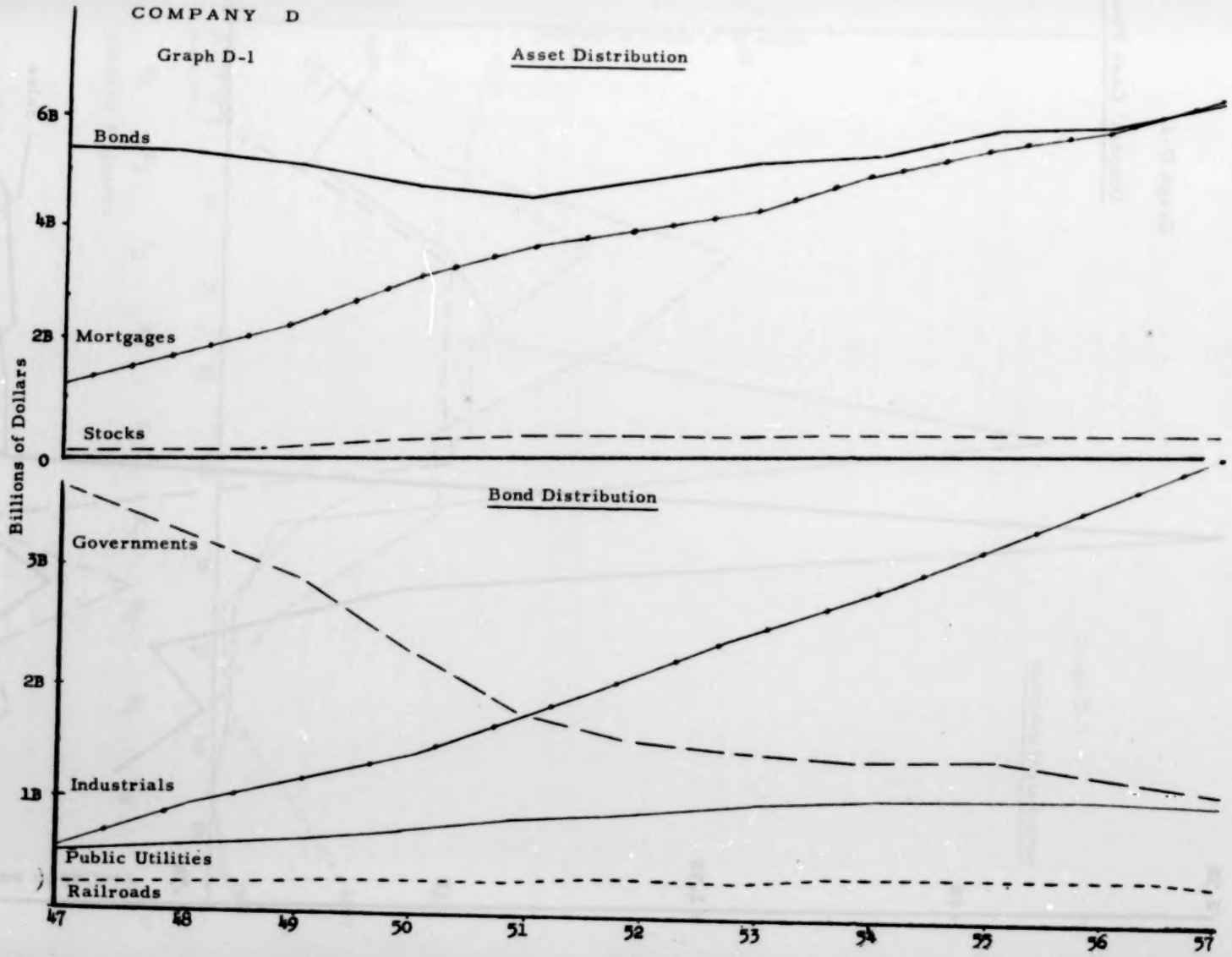
A Comparison of the Four Companies

Yield. It is remarkable that, in spite of the diversity of maturity, Liquidity, and sales policies, the net portfolio yields of the four companies remain so similar (Graph 1b). However, when yield is defined to include capital gains and losses, the experience of Company A departs sharply from that of the other three companies (Graph 5a). The yield performance of this company is impressive, especially since the gain from trading (A-A') is also accompanied by a gain of maturity yield. On a gross yield basis this company has been earning 4 per cent since 1949. For the other three companies there are no consistent differences between yield inclusive of capital gains and losses and net yield.

The four companies consistently earn a net yield above the average

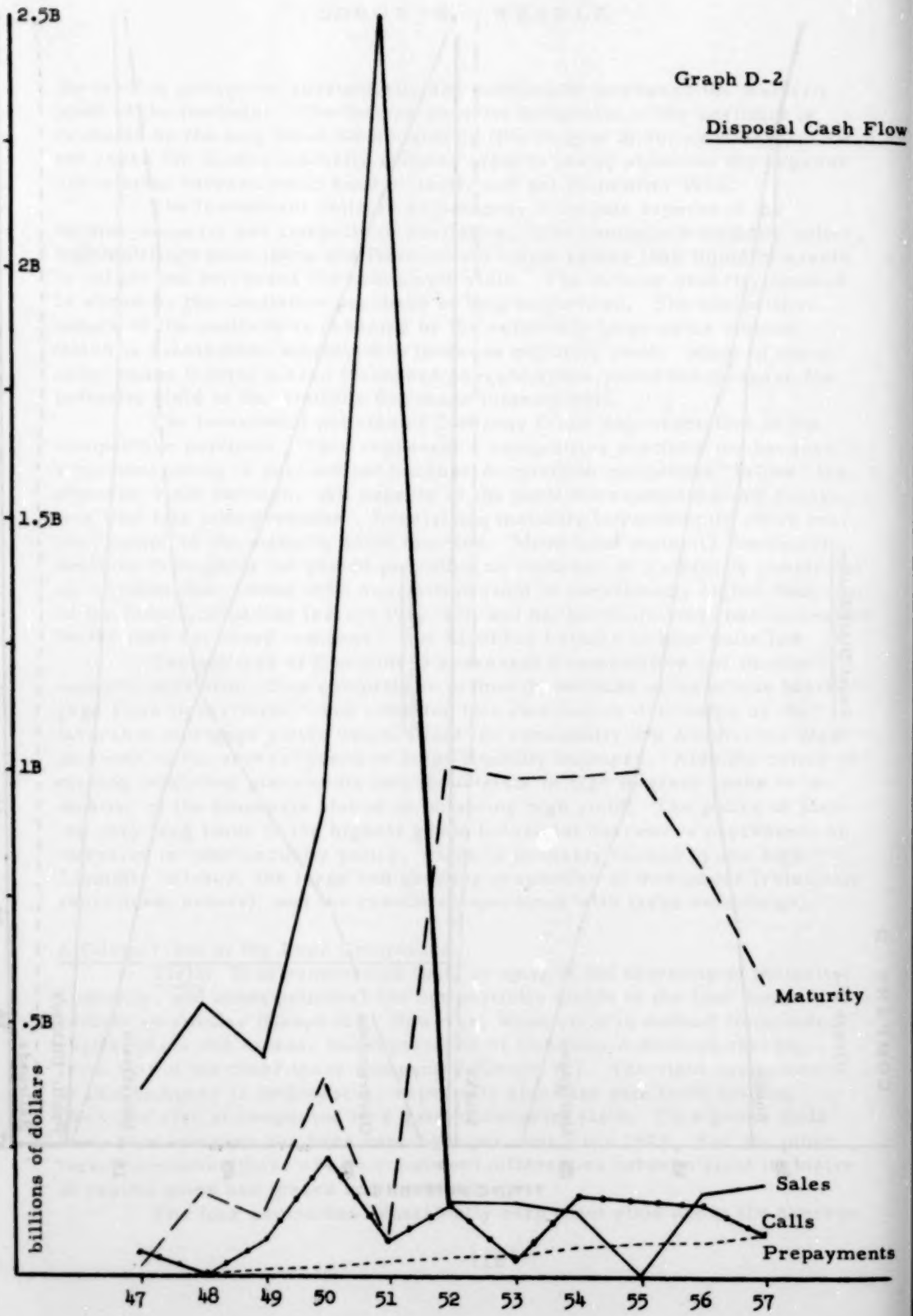
COMPANY D

Graph D-1



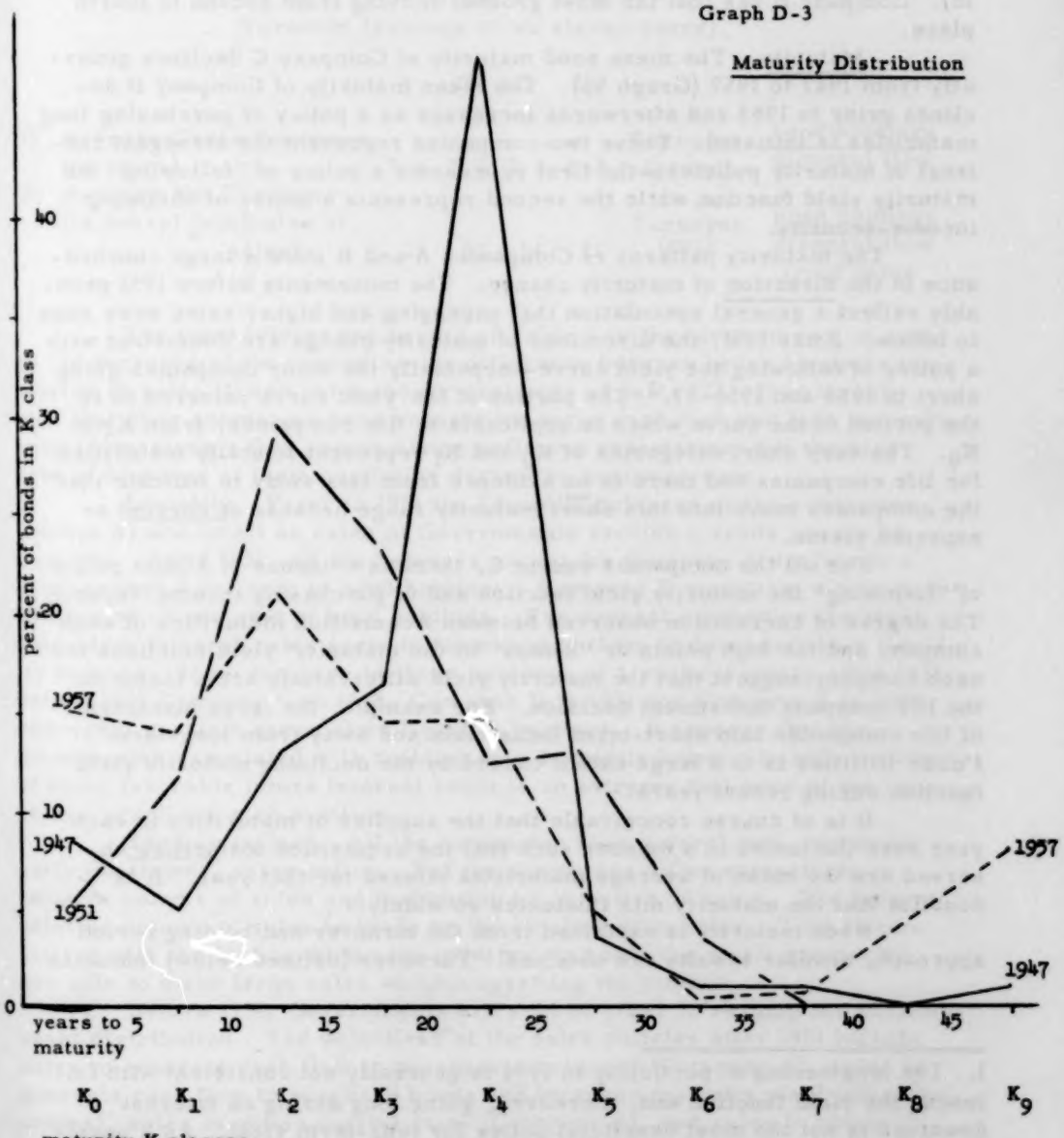
Graph D-2

Disposal Cash Flow



Graph D-3

Maturity Distribution



for the industry (Graph 1b). Over the period, Company C has shown the greatest relative increase, moving from lowest to second position (Graph 1b). Company B has lost the most ground, moving from second to fourth place.

Maturity. The mean bond maturity of Company C declines generally from 1947 to 1957 (Graph 5b). The mean maturity of Company D declines prior to 1953 and afterwards increases as a policy of purchasing long maturities is initiated. These two companies represent the strongest contrast of maturity policies—the first represents a policy of "following" the maturity yield function while the second represents a policy of obtaining income-security.

The maturity patterns of Companies A and B show a large concordance in the direction of maturity change. The movements before 1951 probably reflect a general speculation that unpegging and higher rates were soon to follow. After 1951, the directions of maturity change are consistent with a policy of following the yield curve—especially the many companies going short in 1953 and 1956-57.[1] The portion of the yield curve referred to is the portion of the curve which is applicable to life companies, from K_2 to K_9. The very short categories of K_0 and K_1 represent liquidity maturities for life companies and there is no evidence from this study to indicate that the companies move into this short maturity range because of current or expected yields.

For all the companies except C, there is evidence of a joint policy of "following" the maturity yield function and of purchasing income-security. The degree of correlation observed between Acquisition maturities of each company and the high points or "humps" of the maturity' yield functions of each company suggest that the maturity yield differentials are a factor in the life company investment decision. For example, the large placements of life companies into short-term Industrials and away from long-term Public Utilities is to a large extent caused by the declining maturity yield function during recent years.

It is of course conceivable that the supplies of maturities in each year have fluctuated in a manner such that the acquisition maturities observed are the mean of average maturities offered for that year. It is doubtful that the maturity mix fluctuates so widely.

When maturity is examined from the turnover and holding period approach, similar results are obtained. Turnover (defined below) indicates

1. The lengthening of portfolios in 1954 is generally not consistent with following the yield function and, moreover, going long during an interest downturn is not the most beneficial policy for long-term yield. As a possible explanation, the sharp decrease of liquidity balances and the striking increase of Acquisition maturity during 1954 suggest that the companies were acting defensively and going long to hedge against a further decline of long-term yields. There are many instances in the past where life companies' fear of income-risk led them to go long at just the wrong time, at the bottom of an interest cycle (e.g., 1937 and 1944).

a portfolio somewhat longer than is indicated by the listed maturities.

Table 2
Turnover (average of all eleven years)

	A	B	C	D		
(1) Average Gross Turnover (in years)	3.4	7.3	3.8	5.2	Turnover (gross)	$\frac{\text{bond holdings}}{\text{disposal flow}}$
(2) Average Net Turnover (in years) (exclusive of sales)	26	32	14	21	Turnover (net)	$\frac{\text{bond holdings}}{\text{disposal flow from sales}}$

The most interesting aspect of Table 2 is the large impact of sales on the turnover of the portfolio—the difference between gross turnover inclusive of sales (1) and net turnover exclusive of sales (2). It is largely true that "life companies have brought the large cash flow and high turnover upon themselves"; they cannot blame calls and redemptions for the high rate of turnover of their portfolios during the postwar years.

Liquidity. Prior to 1951 the Liquidity balances of the companies (except A) are small as sales of Governments provide a ready source of liquidity. After 1951, all the balances except for Company B decline to a level around 3 per cent of bond holdings. Company B maintains a minimal balance of .5 per cent of bond holdings. For several companies the high long-term interest rates seem to have caused them to decrease their liquidity balance. In no company is there evidence of a cyclical policy after 1951; before 1951 Company C in 1948, Company D in 1951 and Company A in 1949 represent possible speculative liquidity holdings. It appears that the income-risk associated with building up a Liquidity balance in anticipation of more favorable future interest rates is so extreme that none of the companies practices such a policy.

Trading (sales). All the companies have a developed, and apparently consistent, sales policy. Yet the companies differ extensively in relative volume of sales and motivation or objective of sales. The largest relative volume of sales is made by the smaller companies. This is consistent with the feeling within the industry that only the small companies are able to make large sales without upsetting the market.

Before 1951, Governments are sold in order to revamp the portfolio asset distribution. The objectives of the sales policies after 1951 include sales to generate cash flow to purchase mortgages (Company A), sales to generate cash flow to purchase bonds and increase maturity yield (all companies), sales to obtain capital gains (Company A), and sales to obtain liquidity (all companies but especially Company B).

Cyclical Policy. The lack of evidence of such policy has been noted.

Concluding Comments

Although the companies all produce a very similar product, each utilizes a different production function consisting of diverse combinations of the "factors," yield, income-certainty, capital-certainty, and default safety. Moreover, the general impression gained from the study is that these diverse investment patterns represent rather sophisticated investment behavior; taboos and legal restrictions play a small role in explaining life company investment.

If the diversity and sophistication of the investment policies of these four companies is at all representative of the investment policies of all United States life companies, then it is appropriate to conclude with a few remarks concerning: (A) an appraisal of the theory, (B) monetary and debt policy, and (C) the capital markets. The previous conclusions have been specific, the following are general.

A. Theory and Data

These remarks relate to the adequacy of the viewpoints and theories expressed in the survey of the literature.

The Slope of the Maturity Yield Function. The theory expressed in the income-security portfolio suggests there is a strong presumption for life companies to "go long," somewhat independent of the slope of the yield function. This implies that, if many institutions have preferences similar to those of life companies, there will be a declining maturity yield function.

This is opposite to the slope suggested by Hicks in his Value and Capital, "most people would prefer to lend short,"[1] i.e., most people prefer capital-certainty to income-certainty. Thus Hicks argues that higher interest rates must be offered on long-term securities in order to induce people to depart from short, "safe" securities. This may be a correct interpretation of individuals' preferences; it is clearly an invalid interpretation for life insurance companies.

The preceding analysis has shown that the maturity yield functions of the companies studied have been downward sloping from K_2 to K_9 during most years since 1951. Although the shorter portion of the curve (K_0 and K_1) does steepen and flatten as cyclical interest fluctuations take place, the longer portion of the yield curve remains unaffected by the shorter-term gyrations. The generally downward slope of the yield function is consistent with the hypothesis that the "income-certainty" lenders outweigh the "capital-certainty" lenders relative to existing maturity supplies.[2] Put differently, "widows and orphans" outnumber "commercial banks." There also is evidence from this study that the yield function of non-Governments

1. J. Hicks, Value and Capital (Oxford University Press, 1939), p. 146.

2. Cf. "Culbertson on Interest Structure: Comment" by the author, Quarterly Journal of Economics, LXXII (November 1958), p. 601, for a sketch of a theory of the maturity yield function on which the above conclusions are based.

leads a separate life from the yield function of Governments. The two functions often slope in different directions from K_2 to K_9. A study of these differentials might provide information on the degree of substitution between non-Governments and Governments.

Default Risk. The extent of the interactions between default risk and maturity was one of the unexpected, and in this writer's opinion, important findings of this study.

In effect, the life investment officers state that they can make a somewhat objective judgment concerning the near future, but only a subjective guess about the distant future. Thus the 30 year security of Company Z is more risky than the 5 year note of Company Z. This time-dimension of default risk would cause an increasing maturity yield function (all other factors equal) were it not for risk differences among individual companies. Thus the default risk premium consists of two components: (1) time risk and (2) company risk. If the mix of default grades of securities were equal in all maturity ranges, then the yield function would slope upward because of factor (1). However, if there is a form of rationing from the supply of funds side of the market which forces risky companies to issue short securities, then factor (2) may cause a declining yield function (unless offset by factor (1)).[1]

There is strong evidence from interviews that life companies do impose a form of risk/maturity rationing. The companies seem to say, we will assume more risk if compensated by a higher coupon yield, but we reserve the right to choose the maturity of the security. Thus life companies assume increased company risk for decreased time risk and increased coupon yield. This factor partly explains the shortening maturities of life companies during the postwar period. Life companies have attempted to broaden their lending markets in order to absorb increased placements without a rise in default risk.

Moreover, if the life companies set a ceiling on the amount of default-risk they are willing to accept, it may be impossible to purchase a long portfolio. For if there are only a few blue-chip corporations, then there is necessarily only a small supply of acceptable long-term securities for life companies. It is essential that the theory of life company investment and the theory of the maturity yield function be modified to take into consideration the interdependence of maturity and default risk. Furthermore, in dealing with empirical data, it is essential that a procedure be devised which permits identification of the interacting variables which determine yield, such as company risk (default risk), time risk, and maturity

1. Thus the previous conclusion that the desire for income-security causes the declining maturity yield function is not the only possible explanation of this phenomenon. Yet it is the most plausible explanation. If the mix of default grades of securities is fairly equal throughout all maturities and if most investors are willing to trade increased default-risk for increased yield independent of the maturity, then the slope of the yield function would be positive (because of (1) time risk).

yield differentials. Without identification of the effect of each of these on yield, statements about maturity yield functions and default risk differentials are spurious.

Liquidity. The theory also gives insufficient attention to the interrelationship between trading policy to increase yield and the liquidity balance necessary to implement such a policy. Furthermore, the interviews indicate that all the large companies also hold liquidity as a precautionary balance to hedge their Forward Commitments.

Maturity. The maturity predictions of the theory are borne out in general terms. This can best be stated in the negative: it is not possible to satisfactorily explain the investment decision of life companies without recourse to the explanatory variable, demand for maturity qua maturity. The importance of this theoretical prediction is heightened by the circumstance that the companies probably would have purchased even more maturity were it not for the higher default risk of long maturities. There is no indication that the companies aim for specific target maturities, rather they purchase income-security in general terms. This includes refunding and call protection which should be treated (but was not in this study) as a dimension of maturity.

Governments. The above conclusion of a conscious implementation of a long maturity policy clashes with the finding that few long-term Governments were purchased for permanent holding. It is difficult to explain this in terms of relative yields; in several instances the twenty and thirty year Government rate approached four per cent. Furthermore, the Aaa-Government interest differential has changed very little since 1950. The following supposition is suggested. It may be that the pressure from the borrowing side of the market forces the life companies to try and meet the loan demands in periods of tight money so that when the companies are in need of placements they can count on developed outlets for their funds. This "residual" theory of demand for Governments is similar to the "availability doctrine" whereby banks take care of their regular loan customers first[1] and purchase Governments only when they have "residual" demand. From this point of view, the life companies consider Governments as outlets for residual funds. Though there were residual loanable funds during the 1930's and '40's, during the postwar period the loan market has been "tight" and has not produced a need for residual placements.

Diversity. The diverse patterns of investment among companies appear explicable as the results of (1) differences of risk estimates (both of the life insurance situation and of market assets) and differences of preferences toward risk and return, and (2) differences of opportunity.

It is extremely difficult to disentangle risk estimates and preferences. For example, Company C probably estimates the life company risks differently than does Company D. On the other hand, Company C had poor

1. One investment officer stressed that "we are very conscious of our old customers and try to take care of them whenever they need funds. Some have been dealing with us, on and off, for over twenty-five years."

earnings records during 1945-47 and subsequently a low rate of growth and these factors may have stimulated Company C to increase yield vigorously, even if that involved high income risk. That is, Company C and Company D may estimate income risk similarly and yet Company C may place more emphasis on increasing yield because of the company's need to maintain or restore its competitive position within the industry.

The difference of opportunity is related to company size. It would be impossible for the large companies to have a vigorous sales policy similar to that of Company A. It is whimsical to imagine Company D placing security sales of 3 billion dollars on the market each year. It would then be a distinct oligopolist in the market for second-hand bonds.

The smaller companies are able to move around in the market much more freely. They can afford to purchase smaller size securities,[1] specialize in smaller markets and generally reach into smaller cookie jars than the larger companies. It seems likely that if Companies A and D were netted of this "difference of opportunity," their portfolio policies would be much more similar.

The large companies, on the other hand, have special markets available to them. They reach national mortgage markets through agency arrangements, etc., and they deal extensively in Forward Commitments, Leasebacks and other sophisticated means of loan placements. Their cost-savings in investment and insurance operations (economies of scale) are probably substantial through the use of electronic computation and data handling equipment.

Undoubtedly many of the observed differences in investment are caused by differences in motivation and ability and attitudes of the top directors of the companies. To "explain" adequately the observed differences, these personality factors would have to be explored in detail.

Period Studied. The period studied is not sufficiently long to adequately study institutions with liability maturities exceeding fifty years. For instance, the investment officers of Company D state that income-security defense is one of their primary objectives, that they always specify almost complete call protection in Direct Placements. Yet over a ten year period this long-run policy is not observable. Also the effect on future cash flow caused by current purchases of amortizable Industrials is not revealed.

B. Monetary and Debt Policy

Two of the most significant conclusions of the study have a bearing on monetary and debt policy. The two conclusions are complementary: maturity is chosen partly to increase yield on the basis of maturity yield differentials and maturity is chosen partly to increase income-security independent of maturity yield differentials. Responsiveness to maturity

1. As a general rule the small companies have about the same number of securities as the large companies, only the dollar value of each security is much smaller.

yield differentials has implications for the "Bills Only Doctrine" and desire for long maturities has implications for Debt Policy.

Bills Only Doctrine. This is a Federal Reserve practice initiated in 1953 whereby open market operations are conducted by the exchange of only the shortest-term securities, Treasury Bills.

The theory which underlies this practice assumes that any change in the short-term rate caused by an altered supply of Treasury Bills will induce market investors to purchase or sell long-term and medium-term bonds until the long-rate is in line with these investors' expectations of future conditions and rates. The essential premise of the theory is that there are in the market investors who are willing to substitute short maturities for long maturities (or medium maturities) whenever they believe maturity yield differentials are "out-of-line" with their expectations.

Life companies do not belong to the investor group described above. Life companies do not switch from K_9 to K_0 or conversely. Yet life companies do substitute within the K_2 - K_9 range of Government and non-Government maturities. Thus life companies perform at least part of the maturity substitution required by the Bills Only Doctrine.

Yet the finding that the non-Government maturity yield function is often of different slope from the Government yield function brings up a question of a different order. If the maturity yield function of Governments is upward sloping during easy money periods while the yield function of Industrials remains downward sloping, this may imply that long-term Governments and long-term Industrials are not close substitutes, whereas long and short-term Governments are close substitutes. These are merely conjectures—the different slopes suggest that further study of the changing maturity yield differentials of Governments and Corporates over the interest cycle will provide information on the securities and maturities which are close substitutes with Governments.

There is also evidence that the long-term rate of interest is quite stable, that these rates do not closely follow the long-term Government rates. This has implications concerning the efficacy of monetary policy in controlling the Corporate long-term rate by changing the Government long-term rate.

Debt Policy. These concluding comments have considered the paradoxical fact that life companies do not purchase Governments despite the high income-security, excellent call protection and very small yield sacrifice they entail. It was suggested previously that a plausible explanation is that life companies desire income-security but are under continual pressure to meet the needs of their borrowing clientele. The life companies can fulfill both objectives by purchasing long-term Railroads, Public Utilities (Companies A and B), and long-term Industrials (Company D). The Government securities are in the same maturity range and hence offer no special inducement to life companies in terms of income-security.[1]

1. The lower yield probably just offsets the greater call protection and default safety.

However, the Treasury might be able to tap the latent desire for income-security of life companies by issuing a very long-term bond, one that does not compete with existing market maturities. It appears that the latent desire for income-security has already produced the prototype of the suggested security. This is the 100 year bond of Company D. The envisaged issue should have a 50 to 100 year maturity, a 3.5 to 3.9 per cent coupon and be noncallable and preferably a "tap" issue. The "tap" issue means the security would be available for purchase from the Treasury for an extended period. This security would fit perfectly the avowed policy of the Treasury to "tailor securities to the needs of investors."

Pin-In Effect. There is no evidence that life companies are constrained in their sales of securities by capital losses. In fact, much of the portfolio analysis consisted in demonstrating that life companies willingly assume capital losses so long as the new Acquisitions yield more than the existing maturity yield on the old securities. Opportunity cost is the determinant of action as economic theory predicts.

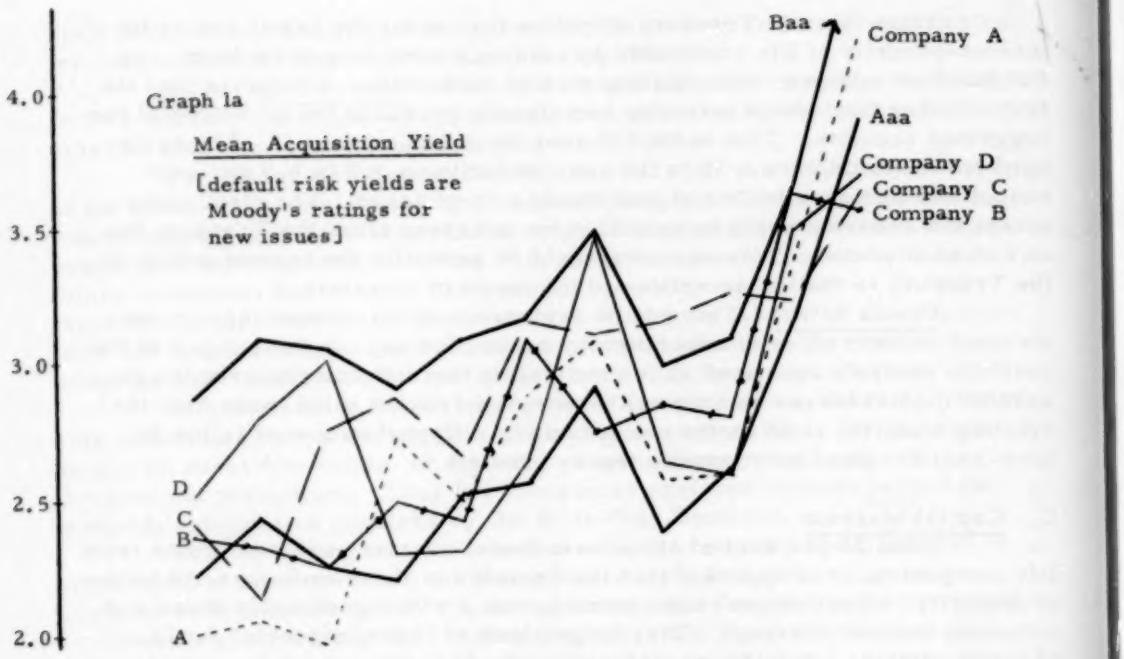
C. Capital Markets

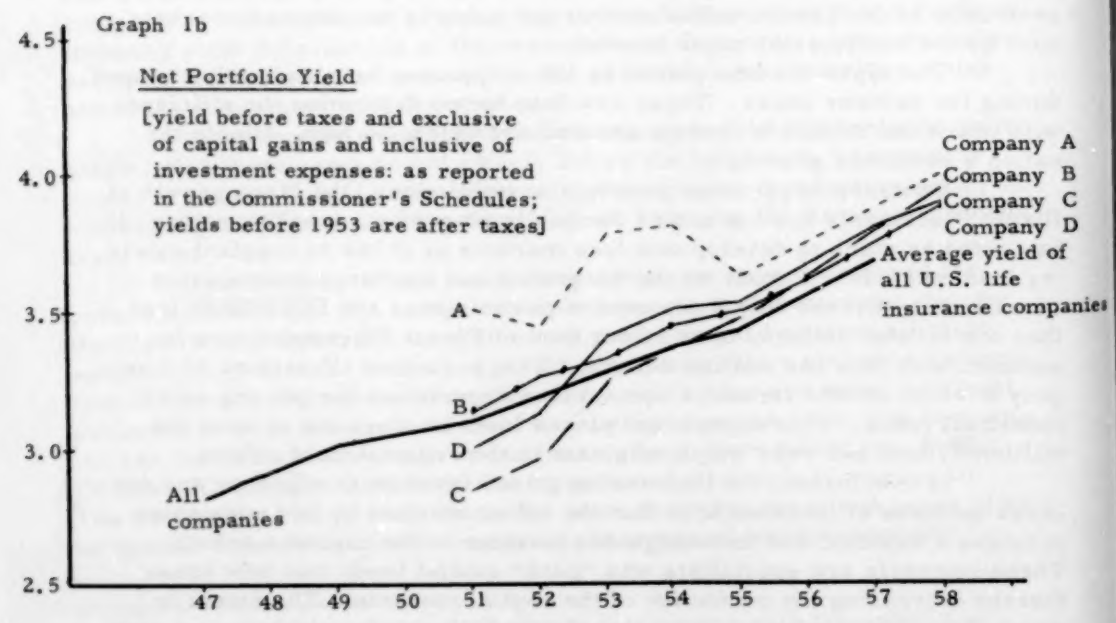
Since 25 per cent of all private funds invested each year come from life companies, it is apparent that the demands of these investors, in terms of maturity, amortization requirements, etc., will significantly shape and influence market offerings. This large block of "knowledgeable" funds, 17 billion dollars annually, provides a continual testing and judgment of default risk differentials, maturity yield differentials, etc. In addition, the large volume of liquidity assets held by life companies increases the perfection of the Treasury Bill market and helps to develop new markets such as the commercial paper market.

The types of loans placed by life companies have radically changed during the postwar years. These new loan forms determine the efficiency with which the country's savings are utilized which, in turn, affects the nation's economic growth.

Contrary to previous pessimistic predictions, the large growth of Direct Placements has not stifled the public placements market; rather, it has acted as much to develop new loan markets as it has to supplant existing loan markets. A study by the Securities and Exchange Commission reveals that whereas only 3 per cent of public issues are in amounts less than one million dollars, over 40 per cent of Direct Placements are in amounts less than one million dollars. This is further illustrated by Company D which in 1955 formed a special loan department for placing small industrial loans. This department places loans at a volume of over 100 million dollars per year which originate in the regional field offices.

In conclusion, the impression gained from these vigorous and diverse patterns of investment is that the intermediation by life companies provides a dynamic and knowledgeable investor in the capital markets. These investors are specialists who "push" capital funds into new areas thereby increasing the perfection of the capital markets. The extent to which these intermediaries have transformed the capital markets is a rich field for further study.

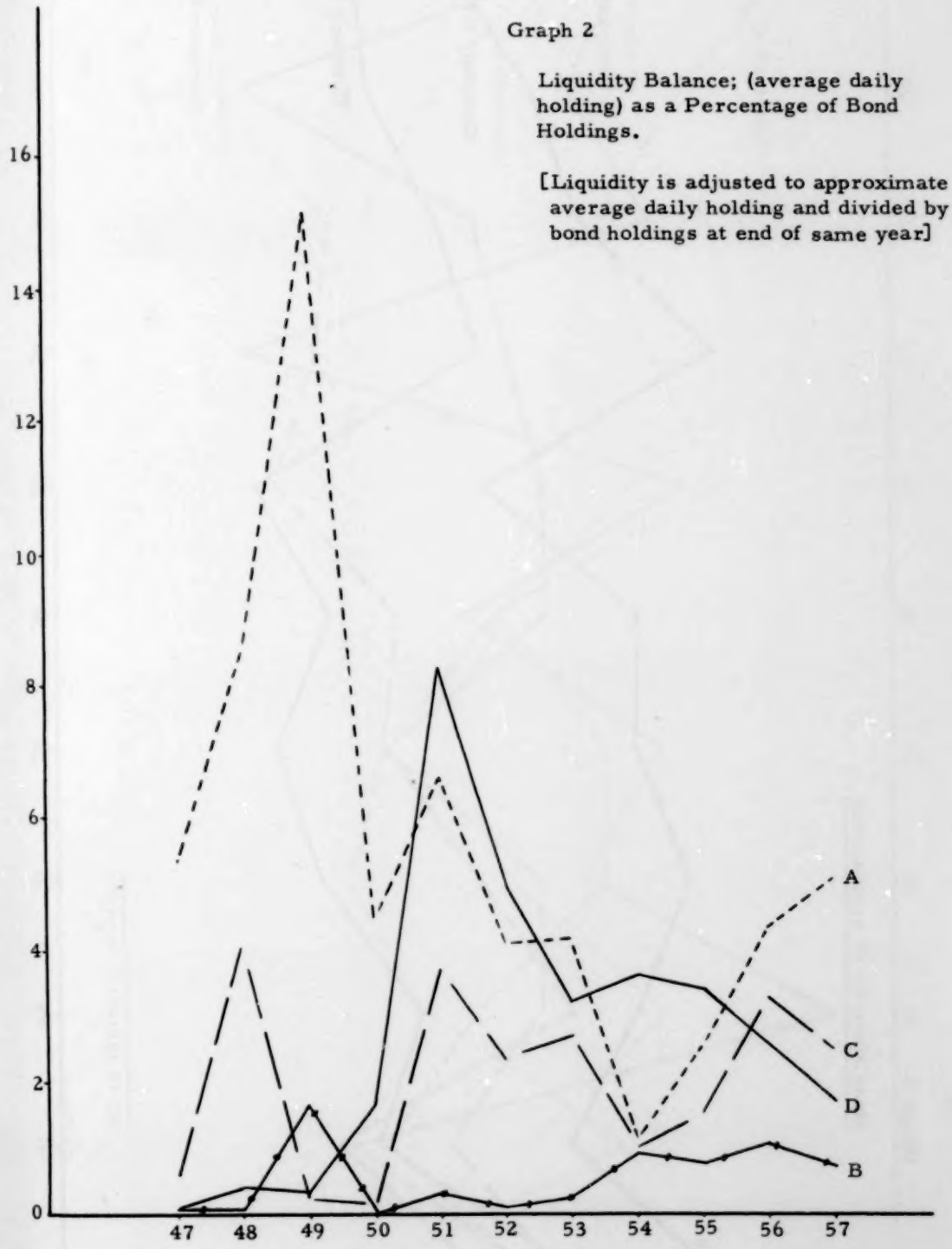

Graph 1a
Mean Acquisition Yield
[default risk yields are Moody's ratings for new issues]
4.0
3.5
3.0
2.5
2.0
Baa
Company A
Aaa
Company D
Company C
Company B
D
C
B
A


Graph 1b
Net Portfolio Yield
[yield before taxes and exclusive of capital gains and inclusive of investment expenses: as reported in the Commissioner's Schedules; yields before 1953 are after taxes]
4.5
4.0
3.5
3.0
2.5
47
48
49
50
51
52
53
54
55
56
57
58
Company A
Company B
Company C
Company D
Average yield of all U.S. life insurance companies
A
B
D
C
All companies

Graph 2

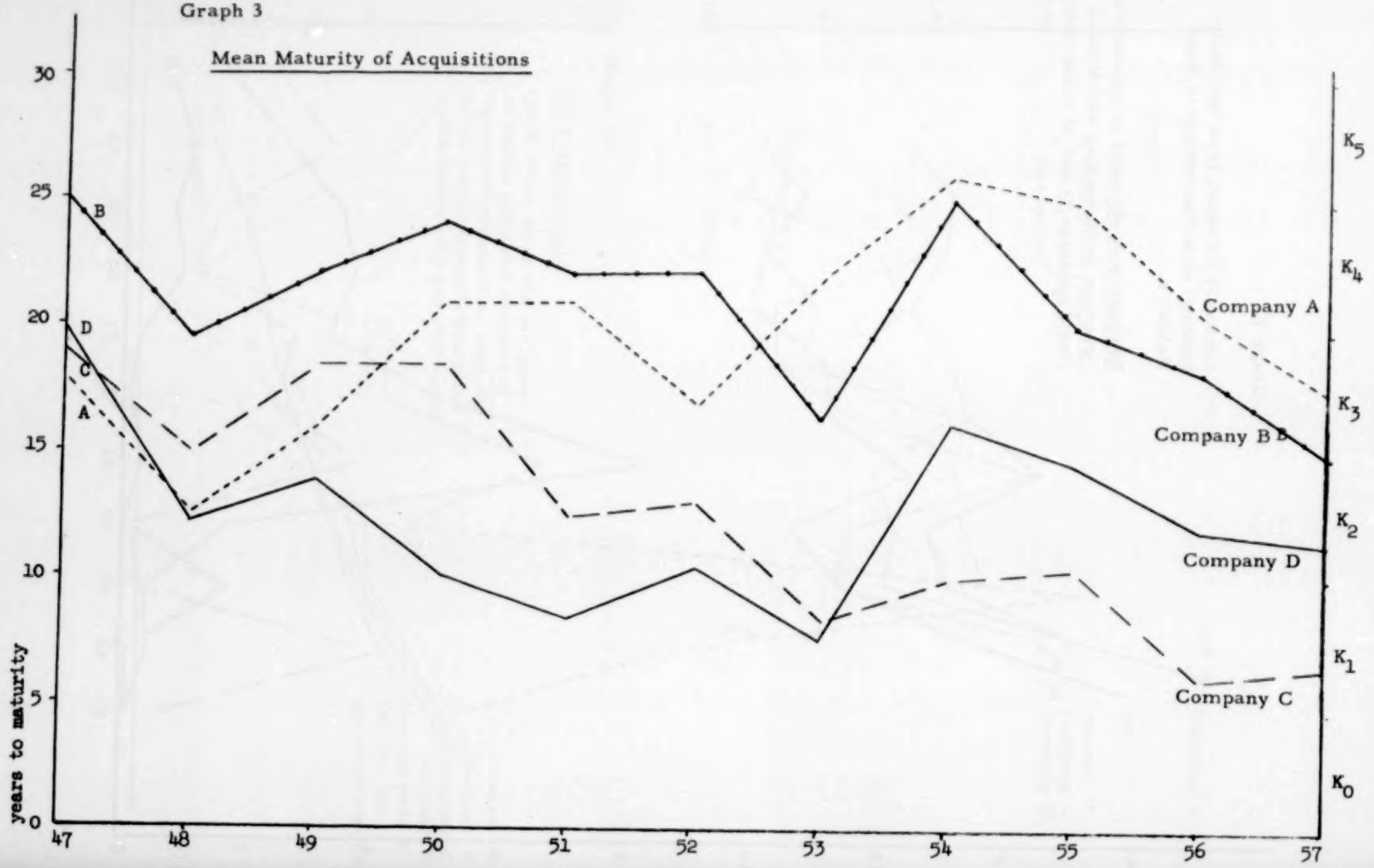
Liquidity Balance; (average daily holding) as a Percentage of Bond Holdings.

[Liquidity is adjusted to approximate average daily holding and divided by bond holdings at end of same year]



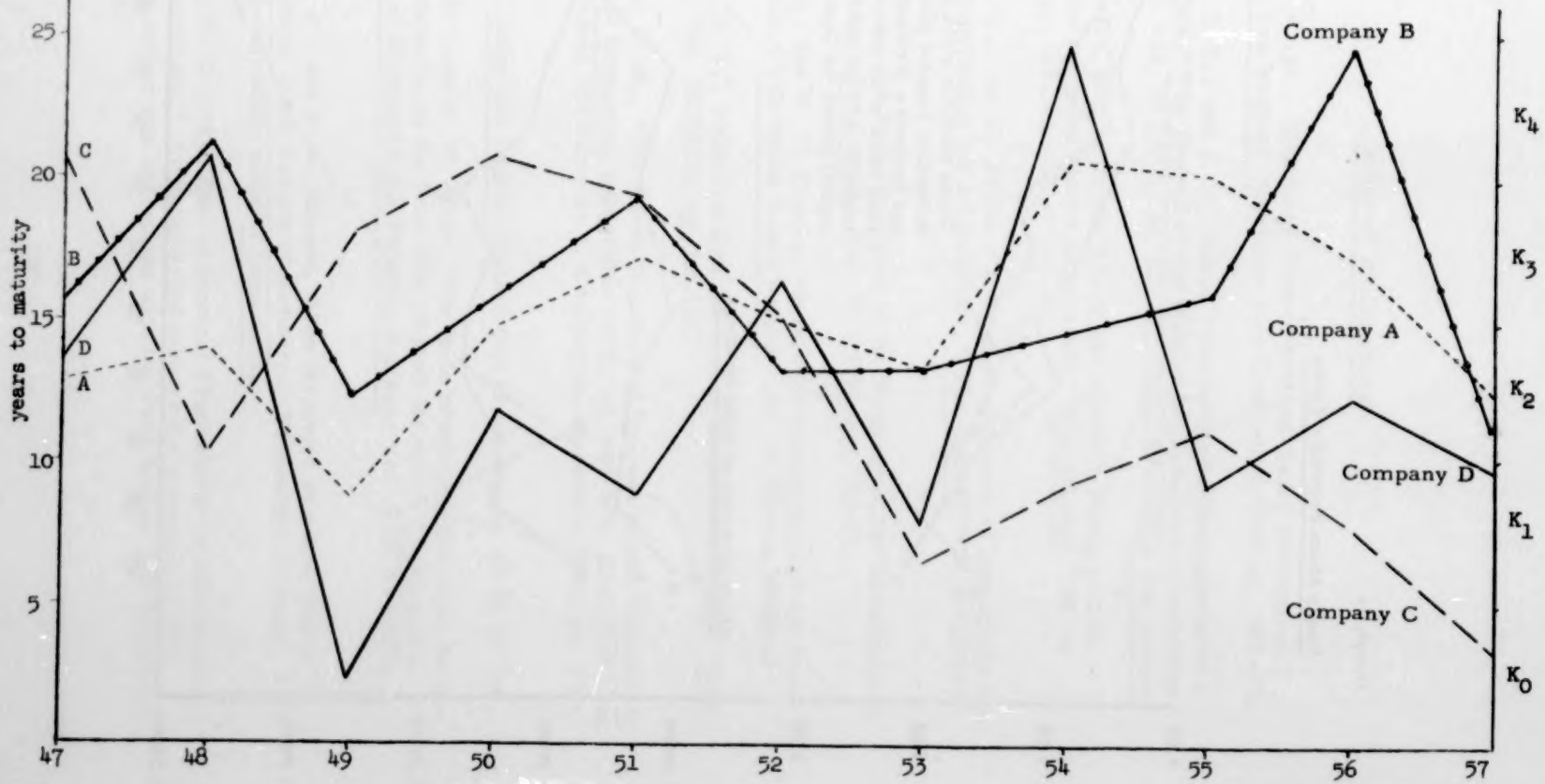
Graph 3

Mean Maturity of Acquisitions



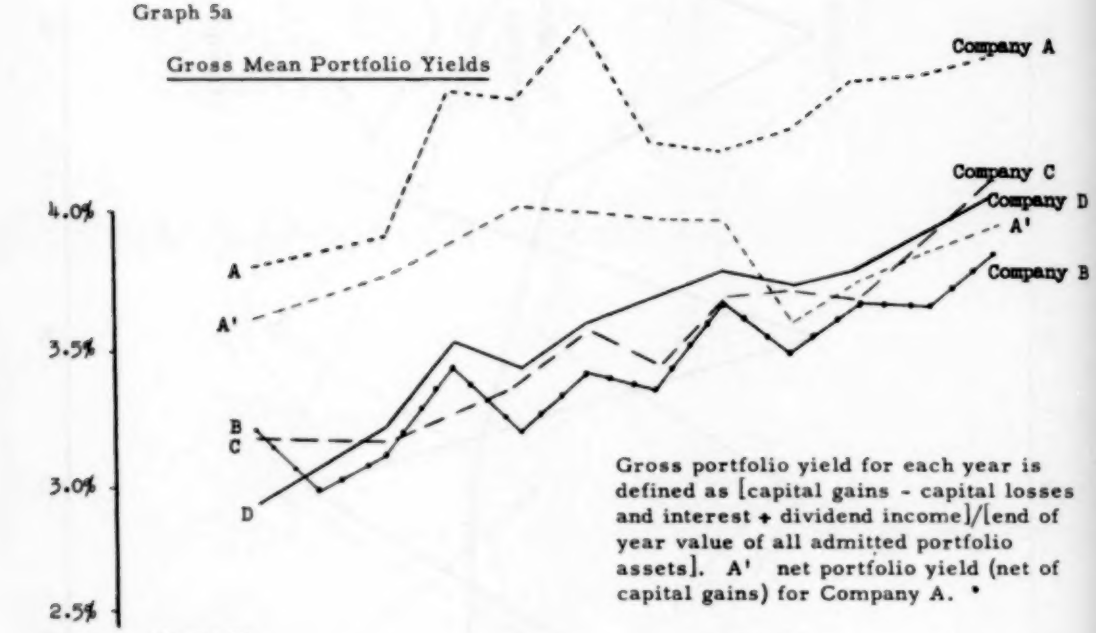
Graph 4

Mean Maturity of Sales



Graph 5a

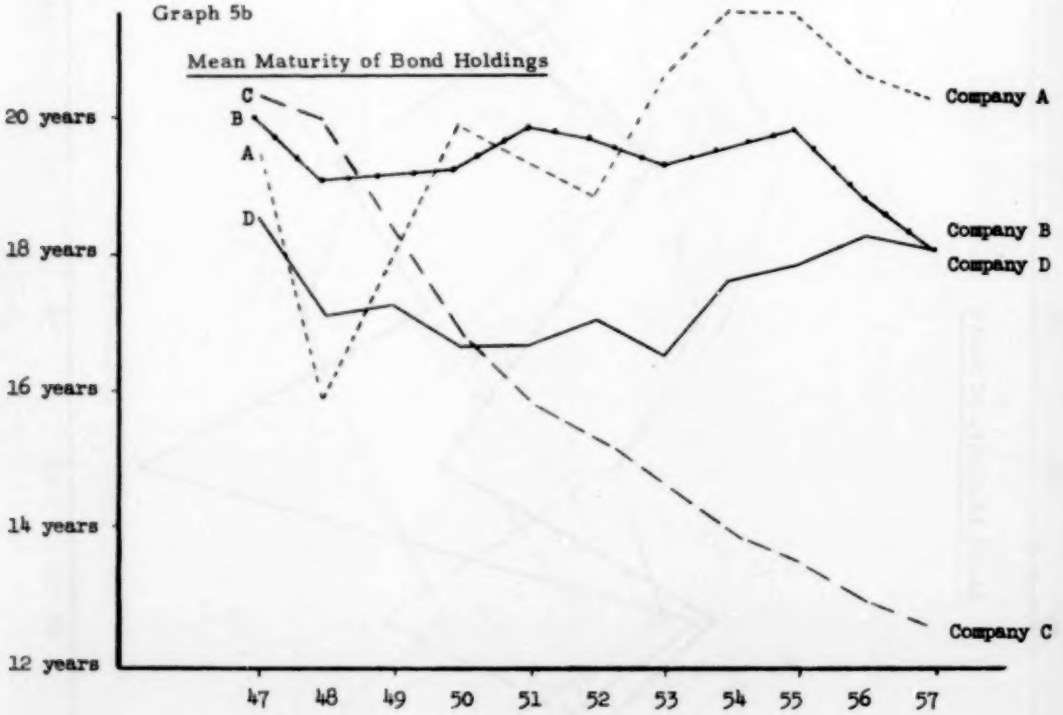
Gross Mean Portfolio Yields



Gross portfolio yield for each year is defined as [capital gains - capital losses and interest + dividend income]/[end of year value of all admitted portfolio assets]. A' net portfolio yield (net of capital gains) for Company A.

Graph 5b

Mean Maturity of Bond Holdings



Selected Bibliography

1. Anderson, W. M., "The Long View of Life Insurance Investment," General Proceedings, American Life Convention, 1954; pp. 355-372.

2. Anderson, J. L., and J. D. Binns, "The Actuarial Management of a Life Office," The Journal of the Institute of Actuaries, Cambridge, England, Vol. 83 (1957), pp. 112-252--hereafter called The Journal.

3. Bailey, A. H., Esq., "On the Principles on which Funds of Life Assurance Societies should be Invested," The Journal, Vol. 10 (1862), pp. 142-147.

4. Bailey, G. V., and W. Perks, "A Consistent System of Investment and Bonus Distribution for a Life Office," The Journal, Vol. 79 (1953), pp. 14-73.

5. Clarke, H. G., "A Broad Analysis of the Problem of the Investment of Life Funds," The Journal, Vol. 80 (1954), pp. 335-89.

6. Clayton, G., and W. T. Osborn, "Insurance Companies and the Capital Market," The Three Banks Review, No. 37 (March, 1958).

7. Coutts, C. R. V., "Notes on Life Assurance Investment Policy," The Journal, Vol. 56 (1925), pp. 121-152.

8. Culbertson, J. M., "The Term Structure of Interest Rates," Quarterly Journal of Economics (November 1957), pp. 485-517. Also Comment by L. Wehrle and Reply by J. Culbertson, November 1958, pp. 601-613.

9. Hicks, J., Value and Capital (Oxford University Press, 1939), p. 146.

10. Hood, W. C., and O. W. Main, "The Role of the Canadian Life Insurance Companies in the Post-War Capital Market," The Canadian Journal of Economics and Political Science, Vol. XXII (November 1956).

11. Kirton, R. J., and A. T. Haynes, "The Structure of a Life Office," Transactions of the Faculty of Actuaries, Edinburgh, Scotland, Vol. 21 (1953)—hereafter called Transactions.

12. Koopmans, T. C., "The Risk of Interest Fluctuations in Life Insurance Operations." An unpublished manuscript prepared in 1942 while the author was associated with the Penn Mutual Life Insurance Company.

13. Life Insurance Fact Book, Institute of Life Insurance, various years, published annually.

14. Markowitz, H., "Portfolio Selection," The Journal of Finance (March 1952). Also, more recently, Portfolio Selection, Monograph 16 of the Cowles Foundation, Wiley, 1959.

15. Murray, A. C., "The Investment Policy of Life Assurance Offices," Transactions, Vol. 16 (1937).

16. Pegler, J. B. H., "The Actuarial Principles of Investment," The Journal, Vol. 74 (1948), pp. 179-211.

17. Penman, W., "A Review of Investment Principles and Practices," The Journal, Vol. 64 (1933), pp. 387-427.

18. Reddington, F. M., "Review of the Principles of Life-Office Valuation," The Journal, Vol. 78 (1952), pp. 286-340.

19. Robinson, J., The Rate of Interest (MacMillan, 1952), pp. 1-28.

20. Tobin, J., "Liquidity Preference as Behavior Towards Risk," Review of Economic Studies, XXV (2), (February 1958).

GOVERNMENT SECURITIES ON COLONIAL NEW ISSUE MARKETS: AUSTRALIA AND CANADA, 1895-1914

Ian M. Drummond

In recent years, historians and economists have devoted much effort to the historical study of economic development before 1914. It has apparently been hoped that the historical evidence might cast some light upon techniques and problems of economic growth in the backward countries of the present day. At the same time, scholars have continued the exploration of national economic histories—explorations in which they have been engaged for several decades past. The present study should be relevant to both sorts of inquiry. On the one hand, it traces the outlines of a process which national historians have hardly noticed; on the other hand, it provides fresh evidence on the financing of public investment, which is increasingly recognized to be of great importance at the beginning of self-sustained growth. The existing literature has rightly stressed the importance of international capital flows before 1914, without discussing the importance of local finance. The evidence shows that in Australia and in Canada local finance and local financial institutions were of great importance to colonial businesses and governments—of far greater importance than the existing literature suggests. It also shows that in these two countries sophisticated and fairly flexible financial mechanisms had evolved surprisingly early. The operation of these mechanisms can be observed during the years between 1895 and 1914—years of a "growth takeoff" in Canada, and of steady though less spectacular economic progress in Australia. The larger work from which this essay has been extracted[1] contains comparisons of mortgage markets and corporate securities markets in these two countries. The present essay is devoted only to the markets in government securities —federal, regional, and municipal.

1. Structural Similarities and Differences

As this essay is concerned with the financing of public investment in Canada and Australia, it is necessary to know what responsibilities these governments had undertaken. The two economies differed profoundly in the scope they allowed to government economic activity. These differences naturally affected the relative offerings of public and private securities, public and private capital formation, and all aspects of the financial machineries of the two countries. In Australia the governments provided the railways, the telephone and telegraph services, the water supplies and the tramways. They also provided most of what hydroelectric and thermal electric power there was. In Canada the governments did much less. Though Canadian economic historians have stressed the role of government

1. "Capital Markets in Australia and Canada, 1895-1914: A Study in Colonial Economic History," Ph.D. dissertation, Yale University, June 1959.

in national economic development, in no part of Canada were the governments responsible for so many capital intensive activities as in Australia. The Dominion government built some railways and subsidized others with cash and land, but the larger part of the railway system was in private hands until after 1914. Though the three prairie provinces invested heavily in public systems of telephones and grain elevators,[1] and though all the provinces had assisted private railway construction by guarantee or subsidy, only Ontario had ventured to operate a railway line itself or to enter the electric power business.

In Australia public and private capital formation were of approximately equal orders of magnitude. Precise figures are available within our period only for 1895-1900; over this period public investment was 67 per cent of new fixed capital formation.[2] In subsequent years the general pattern was much the same, though after 1903 the relative importance of the private sector certainly grew.[3] In Canada, gross public direct capital formation was much less important, for between 1900 and 1915 it made up only 13 per cent of gross fixed capital formation.[4] While this proportion would be higher if net figures were available, it could hardly approach the Australian level. When one remembers in addition that the Australian state budgets were usually in balance on current account while in Canada the Dominion budget and some provincial budgets were in current account surplus through much of our period, it is clear that the Australian public sector must have needed much more external finance than the Canadian.

Within the public sectors of the two economies functions were differently allocated. These differences affected both the structures of demands for external finance and the flows of new issues. When the Canadian provinces united in 1867 they surrendered most of their functions and all of their debts to the Dominion; when the Australian colonies federated in 1901 they kept most of their functions and all of their debts. Though this statement is a commonplace of constitutional history it is sufficiently important to merit repetition. Furthermore, in general the Australian states were less willing than the Canadian provinces to delegate functions to the "junior governments"—municipalities, harbor boards, and sewage boards. In New South Wales, for instance, the state provided water supplies,

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1. For further detail see S. Bates, Financial History of Canadian Governments, Ottawa, King's Printer, 1939.

2. N. G. Butlin, Private Capital Formation: Estimates 1860-1900 (Canberra, Australian National University, 1955), Table A.

3. From 1861 to 1900, public capital formation was about 50 per cent of aggregate new capital formation. This proportion probably can be applied to the period 1900-1914. Ibid.

4. K. Buckley, Capital Formation in Canada 1896-1930 (Toronto, University of Toronto Press, 1955), pp. 54, 135.

sewage systems, harbors, and even tramways throughout the state. Naturally there were differences between one state and another; indeed, in Victoria the municipalities and boards of works had great autonomy and considerable power to borrow. But it is not incorrect to state that the Australian states provided services which in Canada were wholly the responsibility of municipalities. By 1914 almost every Canadian town had borrowed to build waterworks and sewage systems; many, particularly in Ontario[10] and on the prairies, operated their own electric plants, telephones and tram systems. Some had even subsidized private railways. Hence the surprisingly small size of the Australian municipal debt—both relative to state debt and relative to Canadian municipal debt. Table 1, which follows, somewhat understates the latter sort of debt, yet even this table shows that in 1914 the Canadian municipalities owed more than both levels of "senior governments" combined. The Australian figures, which are fully comparable with each other, show the overwhelming dominance of state debt and the relatively trivial size of Commonwealth and municipal debt in 1914.

It is also important to consider the differences in flow over our period. Unfortunately there are no Canadian municipal debt figures for any early year; in their absence we must be content with the Ontario data, which are reasonably complete and accurate. They show that Ontario municipal debt grew nearly four-fold between 1895 and 1914, and provincial debt by 355 per cent, while Dominion debt grew by only 34 per cent. Because most prairie cities hardly existed in 1895, while most Ontario cities were well established, this comparison probably understates the difference between the rates at which senior governments' debt and municipal debt grew. In Australia the absolute flow of new municipal issues was very small relative to the flow of new state issues. Indeed, the former was only 13 per cent of the latter, while in Canada the increase in Ontario municipal debt alone was nearly twice as large as the increase in Dominion debt during our period, and nearly as large as the combined increase in Dominion and provincial debt. All these comparisons serve to emphasize a most important conclusion: in Australia the state governments were the principal governmental bidders for loanable funds between 1895 and 1914, while in Canada the municipalities were no less important than the Dominion or the provinces. This conclusion is especially significant in view of our earlier conclusions about the importance of public capital formation in the two economies. In a later section we shall see that a significant portion of this capital formation was financed from domestic sources.

2. Trading in Securities

By 1895 there was organized securities trading in all the Australian capitals. The markets in Brisbane, Hobart and Perth were both small and unimportant, but in Adelaide, Sydney and especially in Melbourne the exchanges were reasonably active, and fairly highly organized on the London model. Both the Melbourne and Sydney exchanges were long-established institutions; indeed, the Melbourne exchange dated from 1859. Though the Melbourne and Sydney exchanges concentrated on the public and private

Table 1
Bonded Indebtedness of Governments[a]

	1895		1914	
	($ thousand) Canada	(£ thousand) Australia	($ thousand) Canada	(£ thousand) Australia
Central government	225,321	none	302,842	9,393
Provincial/state government	28,906	167,033	131,680	317,599
Municipal governments	not available	12,433	504,652	32,686
Total	not available	179,466	939,174	359,680
Ontario municipal governments	52,946	-	195,357	-

a. The Canadian municipal statistics do not include such semi-autonomous "junior governments" as harbor boards and drainage districts. The basic data for 1914 come from the Royal Commission on Dominion Provincial Relations, Report, Book II, p. 20; they apply to 1913-14. The same source gives provincial bonded indebtedness as $284,968,000, a total which apparently includes contingent and guaranteed liabilities. Dominion debt is from the Canada Year Book. Provincial debt data were obtained from Public Accounts. Dominion and provincial figures exclude "temporary borrowing"—a term which probably covers treasury bills. They also exclude Ontario's railway certificates and annuities, whose present value in 1895 was some $4,000,000. Ontario municipal indebtedness is from Ontario Department of Agriculture, Bureau of Industries, Municipal Bulletin, Nos. 1, 2, 9. The figures exclude temporary borrowings for current expenses.

The Australian figures for 1914 come from Australia, Commonwealth Bureau of Census and Statistics, Finance, and from the Official Yearbook of the Commonwealth. They do not include the amount which the Commonwealth owed the states on account of properties which it took over, but they included "Treasury Bills" since in Australia these securities formed part of short term funded debt. The figures for 1895 are from T. A. Coghlan, The Seven Colonies of Australia, Sydney, 1892-. They do not include Western Australia or Tasmania. £ 14,815,000 of 1914 municipal debt is the debt of autonomous boards in Victoria.

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securities of their states, they had some pretensions to national and even international importance. New Zealand securities were listed in Melbourne, while in mining securities a substantial business was done on British account both in Melbourne and in Sydney.

In 1895 the Toronto and Montreal stock exchanges were the only exchanges in Canada—if one may lump the exchanges proper with the curb

markets in these two cities.[1] In later years there was a short-lived exchange in Victoria, chiefly concerned with mining shares, and even shorter-lived project for an inter-city branch exchange. Permanent exchanges were subsequently formed in Vancouver and in Winnipeg.[2] The former exchange dealt almost wholly in mining shares, while the latter concentrated on a few banks and insurance company stocks. As neither exchange had many members or a large turnover, they did not challenge the pre-eminence of Toronto and Montreal. Like the Melbourne and Sydney exchanges in Australia, Toronto and Montreal were the principal scenes not only for current stock transactions but also for the issuing of new securities. On Canadian exchanges government securities were entirely absent and the turnover was principally in mines, utilities, tramways, industrials, and transportation securities. Banks, insurance companies, and loan companies were also listed but were rarely traded. Though in Melbourne and Sydney the lists contained many state government and municipal securities, the exchanges also dealt in the stocks of local banks, pastoral companies, sugar refineries, breweries, textile mills, and steamship lines, as well as mines.

Thin security markets made most securities illiquid in both countries.[3] In Canada one could easily sell large blocks of mining shares, and occasionally one could sell similar blocks of a few utility shares, without turning the market against oneself. But most of the listed securities could not be sold either quickly or easily. In Australia the large majority of local securities—government and corporate—were equally illiquid. Weeks and months might pass between transactions—even in some government securities—on the Melbourne and Sydney exchanges.

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1. The Standard Stock and Mining Exchange of Toronto was separately incorporated in 1908.

2. Monetary Times, October 10, 1908, p. 599, and January 2, 1909, p. 1088; Royal Commission on Banking and Currency in Canada, Report (Ottawa, King's Printer, 1933), p. 26.

3. In 1913 turnover on both Canadian exchanges totalled only 3,976,000 shares and $6,150,000 in bonds during the entire year. (Canada Board of Inquiry into the Cost of Living in Canada, Report of the Board (Ottawa, King's Printer, 1915), Vol. II, p. 686. The years of greatest activity were in 1901 and 1909, when over 4,700,000 shares changed hands.) Because these figures include a substantial volume of transactions in very cheap mining shares, even they do not fully reveal how narrow the markets were—and by inference how thin the pickings could be for a broker who had no other source of income. The pretensions of the Melbourne exchange look ridiculous when one is told that though there were 122 members, "the exchange meets daily at 10:30 A.M., 12 noon, and 3:10 P.M." (Melbourne Stock Exchange Official List, March 1914.)

3. Domestic Borrowing and Overseas Borrowing

Between 1895 and 1914, the funded debt of the Canadian government rose by 40 per cent, while the Australian state debts rose even more rapidly. Table 2 charts this growth. The Dominion government had never borrowed much at home, but as its debts grew it relied even more heavily on the London capital market. By 1914 its funded debt was insignificant. Canadians have been impressed by this dependence on European finance during this period of rapid economic growth, and from it they have concluded that a domestic new issue market did not exist in Canada. In Australia, the existence of a new issue market was underlined by the growing share of government debt which was held at home. The new obligations of states and Commonwealth were largely domestic obligations. In the face of drought and slow economic progress, the much simpler and less prosperous Australian economy managed to supply an increasing proportion of government loan funds. As the state debt was initially large and as it grew rapidly during our period, this "achievement" was startling. It may or may not have been praiseworthy.

Table 2
Total Debt and Domestic Debt

Canada

	Dominion Government		Provinces	
	Funded Debt $'000	Payable in Canada Per Cent	Funded Debt $'000	Issued in Canada Per Cent
1895	218,225	3	28,906	.17
1914	302,842	0.2	131,680	12

Australia

	Commonwealth Government		States	
	Funded Debt £'000	Issued in Australia Per Cent	Funded Debt £'000	Issued in Australia Per Cent
1895	nil	---	167,033	5
1914	9,395	63	317,599	30

Sources: Canada Year Book; Public Accounts of Canadian provinces; Australia Commonwealth Bureau of Census and Statistics, Finance; T. A. Coghlan, Seven Colonies.

For both countries, foreign long-term finance was important—much more important in Canada than in Australia. In the latter country, capital imports offset 62 per cent of new fixed capital formation between 1895 and 1901, while thereafter they were negative between 1904 and 1911, only recovering in 1912-14. During the period 1895-1914 Australian capital

imports were £ 51,020,000, but between 1900 and 1914 they were only £ 10,041,000 while during the latter period Canadian capital imports were $1,600,000,000—more than thirty times the Australian, and fully 23 per cent of the Canadian nation's gross capital formation during the period.[1] Large portions of those capital imports were either gathered by domestic financial institutions or transferred and allocated through them. But the domestic institutions played a much larger role in these operations in Canada than in Australia.

Because British capital exports have been considered chiefly from the British point of view, the existing literature tends to suggest that British banks and issue houses floated most of the London long-term loans of governments and corporations. It is not often suggested that overseas financial institutions were also active in the British capital market. They handled 19 per cent of all public issues between 1895 and 1914.[2] They certainly handled a somewhat larger share of aggregate capital exports during this period, for many of them raised loans or distributed bonds without using the mechanism of public issue.

Canadian financial institutions were very active in the British capital markets between 1895 and 1914, but Australian institutions were not. The difference between the activities of Canadian institutions and the activities of Australian institutions can be seen most clearly if we examine the methods by which the senior governments of the two countries borrowed in London. Before 1890 the Australian banks were not infrequently responsible for handling the Australian colonies' London issues. After 1890 several states transferred their accounts to the London and Westminster Bank. By 1914 only South Australia still borrowed through a local bank;[3] its borrowings were small relative to the volume of loans which the London and Westminster handled for the other Australian states. In contrast, since 1891 the Dominion of Canada had floated all its long-term London loans through the Bank of Montreal, its permanent fiscal agent. The Bank received its expenses and a handling commission for its services. During our period it handled ten loans for the Dominion, raising nearly fifty million pounds.[4]

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1. R. Wilson, Capital Imports and the Terms of Trade (Melbourne, Melbourne University Press, 1931), pp. 7, 313; N. G. Butlin, Private Capital Formation; K. Buckley, Capital Formation, p. 11.

2. Calculated from report prepared by W. A. Brown, published in The Economist, November 20, 1937, and reprinted in T. Balogh, Studies in Financial Organisation (Cambridge, England, Cambridge University Press, 1947), p. 233.

3. A. R. Hall, The London Capital Market and the Export of Capital to Australia, 1870-1914 (Ph.D. thesis, London University), passim; J. Clapham, The Bank of England (Cambridge, Cambridge University Press, 1944), Vol. II, pp. 399-400; Stock Exchange Year Book.

4. Including refunding issues.

The Bank of Montreal also handled all Ontario's London loans, most of Quebec's, and New Brunswick's single issue. The Canadian Bank of Commerce shared in the business of issuing provincial loans. It inherited the London business of British Columbia when it absorbed the old imperial Bank of British Columbia in 1901, and it also handled most of Saskatchewan's and Manitoba's issues. These two large Canadian banks handled most of the provincial issue business. The occasional provincial loan passed through Lloyds Bank, Parr's Bank, and the National Provincial Bank. These British firms handled £ 4,191,000 in provincial issues[1] during our period. However, the issues through Canadian banks were nearly three times as large. Several Canadian banks also took part in the London underwriting groups which supported Dominion and provincial loans.[2] There is no evidence that the Australian banks ever helped to underwrite Australian government issues in London.

No one handled Australian municipal issues in London because virtually none were made during our period. Canadian issues were floated largely through Canadian firms, and when the apparent issuer was a British firm a Canadian firm often stood inconspicuously in the background. In the years before 1895 Australian municipalities had appeared fairly frequently in the London new issue market; Newcastle, Sydney, Hobart, Launceton, and Melbourne and its suburbs had all made public issues. However, there was no further municipal issue until 1913, when Perth, Sydney, and Hobart borrowed a total of £ 1,275,000.[3] During our period Canadian municipal public issues alone aggregated £ 36,185,000 between the end of 1894 and the end of 1914.[4] Of this amount only £ 4,288,000 came onto the market before the end of 1906. Thirty-two million pounds[5] or approximately one hundred and fifty million dollars, were raised after the beginning of 1907. During the next eight years, aggregate municipal bond sales in Great Britain were estimated to be two hundred and twenty-five million

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1. Compiled from Stock Exchange Year Book.

2. Canada, House of Commons, Standing Committee on Banking and Commerce, Proceedings, 1913: evidence of Sir Edmund Walker, President of Canadian Bank of Commerce, pp. 569 ff.

3. Stock Exchange Year Book. These figures, like all others in this section, are sums of par values. R. Wilson, Capital Imports, p. 41, records an issue of £ 157,000 in 1908. I have been unable to trace this issue in any other source.

4. Ibid.

5. Precisely £ 31,897,000 par value.

dollars.[1] Thus some seventy-five million dollars was raised by the private placement of Canadian municipal securities. This placement compares favorably in volume with the increase in the Dominion government's overseas debt; it was effected principally by Canadian bond houses and banks, through their London offices. These offices also sold bonds to the value of £ 24,620,000 by public flotation. Of the total, £ 23,524,000 were raised by the Bank of Montreal. Thirty-two London merchant banks also handled Canadian municipals, but their public flotations summed to a mere eleven million pounds.[2] Furthermore, a large though unknown proportion of these issues was being handled on behalf of Canadian institutions which had bought the securities from the municipalities but which lacked the will or the apparatus to handle London flotations themselves. The role of the Canadian financial institutions was thus even larger than our statistics suggest. The Dominion, the larger provinces, and a few of the larger cities could all have borrowed in London even if no domestic financial institutions had existed. British issue houses would have accommodated them, just as they had accommodated Canadian governments in earlier decades. But Canadian cities, and particularly the newer western cities where the desire to create social capital was particularly strong, could hardly have tapped the British capital market unless Canadian banks and bond houses had smoothed the way through public offers and private placements. In this procedure the Bank of Montreal was clearly the leader.[3] But the other banks and bond houses[4] also made significant contributions, shrouded though these contributions are in the obscurities of private placement.

In June 1908 the overseas debt of the Dominion of Canada was $221,000,000—slightly smaller than in 1900. By the end of 1909, this debt had jumped nearly 25 per cent to $277,800,000. Thereafter, while government savings deposits contracted from $59,000,000 to $55,000,000 the

1. E. R. Wood estimated that 28 municipalities have sold securities in London and that the par value of these securities was £ 41,190,118. Monetary Times Annual Review, January 1915, p. 121.

2. Precisely £ 11,495,000 par value. Compiled from Stock Exchange Year Book.

3. It is interesting to record a single transaction, in which the Bank of Montreal agreed to handle a Winnipeg bond issue of $7,500,000. This single issue was about half as large as the entire funded debt of Manitoba. J. Castell Hopkins, Canadian Annual Review, 1908 (Toronto, Annual Review Company, 1908), p. 623.

4. The Canadian Bank of Commerce sent "extra good" municipal bonds to London. U. S., National Monetary Commission, Interviews with Canadian Bankers (Washington, Government Printing Office, 1910), pp. 127-128. Presumably other banks and bond dealers did the same.

Dominion's overseas debt rose jerkily to $302,800,000 at March 31, 1914.[1] It is certainly reasonable to suppose that higher yields by government savings deposits[2] at home would have reduced the need for foreign borrowing by the Dominion—whatever assumption one makes about the interest elasticity of aggregate savings. Whether capital imports would have been affected is clearly much more problematical, and indeed highly dubious; unless savings were very interest elastic it is probable that either the rate of domestic capital formation would have been reduced concomitantly or else other borrowers would have borrowed more abroad. The chief beneficiaries of the Dominion's abstemiousness were the Province of Ontario and the municipalities of Canada.

By comparison with the Canadian sterling debt, or even with the unfunded debt which the government savings deposits represented, the Dominion's local funded debt was insignificant. During our period it was highest in 1896, when it touched $9,700,000; thereafter it changed rather little until 1903, and then began a steady[3] fall which lasted until the end of 1914.

Table 3
Domestic Debt as a Percentage of Total
Funded and Unfunded Debt—Canada

1895	19
1900	21
1903	25
1910	19
1914	15.5

Source: Canada Year Book. This table includes funded indebtedness and deposits in government savings banks; it does not include the note issue.

The figures of the table reflect the rise in domestic funded debt during 1896 and in savings deposits between 1895 and 1905, as well as the slight decline in overseas funded debt during this period. By 1905 Canada was less dependent on overseas finance than were the Australian states, but thereafter as the domestic debt shrank while the overseas debt grew the

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1. From Canada Year Book, 1915 and earlier years.

2. Perhaps because it did not wish to compete with the chartered banks, the Dominion government maintained the 3 per cent rate which it had established in 1897—a year when yields were exceptionally low throughout the Western world.

3. The fall was broken slightly in 1910.

total domestic contribution became markedly smaller until by March 1914 it was 4 per cent less than in 1895. Here we see most clearly how the reluctance of the Dominion government to borrow at home, coupled with its elaborate works program, increased its reliance upon sterling finance.

There is no evidence which satisfactorily explains the Dominion's general reluctance to borrow at home. Vague references to different rates of interest really explain nothing, even if a continuous disparity in ruling rates could be demonstrated. Ontario's experience[1] might have led the Dominion to expect that it could borrow at home as cheaply as in London. Canada's Ministers of Finance must have known that large quantities of municipal and industrial securities were successfully sold in Canada every year. Did they think that the Dominion should leave this flow of funds undisturbed by tapping foreign markets exclusively? Or did they dimly perceive that Canada's internal investment boom required not only finance but also foreign exchange? It is hard to believe that they thought the mechanism for distributing a large issue did not exist. During the 1914-18 war the government quickly enlisted the assistance of the banking system to float domestic loans. As Sir Thomas White remarked:[2]

> I discovered when I was Minister of Finance that the Canadian Banking System is the most perfect instrument that a Minister of Finance could have at his hand in floating a loan ... What had I to do? Just call up on the telephone the president of the Canadian Bankers' Association: "I want all the branch banks of Canada notified to do a certain thing." It was done.

Whichever of these explanations attracts us most strongly, we must remember that the Dominion Minister of Finance had no technically trained staff to advise him. He was at the mercy of special pleading from Canadian financiers, and in particular from the Bank of Montreal, the government's fiscal agent. Hence we might consider how the banks were likely to regard a domestic loan. Unfortunately there is no documentary evidence to support any such conjectures.

The provincial governments of Canada, like the Dominion government, tended to borrow overseas between 1895 and 1914. In earlier years several provinces had borrowed at home; by 1890, Nova Scotia had raised over two million dollars on currency debentures,[3] and in 1902 she issued bonds to a Halifax bank in payment of a railway claim. Quebec, which might have had the best objective opportunity of following Ontario's example

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1. See below, p. 34.

2. Journal of the Canadian Bankers' Association, Vol. XXIX, April 1922, p. 358.

3. Nova Scotia, Journals of the House of Assembly, 1890, Appendix I: "Financial Returns," p. 215. See also later years.

did float one issue at home in 1897.[1] Thereafter she adopted a policy of retrenchment; her only further loans were floated in London in 1913 and thereafter. The ambitious and expensive investment programs of the four western provinces were financed in London.

This sweeping statement needs some slight qualification. In the first place, the Province of Manitoba twice sold blocks of bonds to North American dealers,[2] who may or may not have distributed them overseas. In the second place, early in the century the Province of British Columbia had borrowed a million dollars from the Canada Life Insurance Company. The president of the Company described the transaction in these words:

> The Province of British Columbia did not want to put their securities upon the London market because the previous amount they had put on was still in the hands of the underwriters. I was aware of that, I had that information, and we made a proposal to take their bonds, and keep them, and we got a very handsome investment ...[3]

These words indicate how very exceptional this transaction was in 1900, just as the surprised comments of the financial press reflect the uncommon nature of our other principal exception. On May 19, 1914, Messrs. Harris Forbes and Co. offered a five million dollar Alberta bond issue simultaneously in London, New York, and Canada.[4] Harris Forbes was a New York house; its operation seems to have been among the first large Canadian government issues to be floated primarily by American interests, rather than by British and Canadian houses in London. There is no doubt that, except for Ontario, when the Canadian provinces thought of borrowing they automatically thought of London. Though in these few instances their bonds were actually distributed in Canada, there is no evidence that any

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1. Canada, Board of Inquiry into the Cost of Living, Report (Ottawa, King's Printer, 1915), Vol. II, p. 756. Hereafter this work will be cited as Cost of Living Report.

2. Manitoba, Public Accounts (Appendix to Journals of the Legislative Assembly). Bonds were sold in the early years of the century to an eastern broker, R. Wilson-Smith, and also to Chicago trust companies. In addition, a sizeable block was given to the Bell Telephone Company of Canada, in exchange for the Manitoba telephone system. This block seems to have been issued in London almost immediately.

3. Royal Commission on Insurance, Minutes of Evidence (Dominion Sessional Paper, No. 66 of 1906, Ottawa, King's Printer, 1907), p. 980. The bond's coupon rate was 5 per cent—an attractive yield in 1900.

4. Prospectus in London Times, May 19, 1914. The issuing syndicate consisted of Spencer Trask, Equitable Trust, and Harris Forbes, all of New York. Alberta had already issued securities in New York in 1913. Cost of Living Report, Vol. II, p. 735.

provincial government, except the Ontario government, considered the possibility of a domestic flotation.

Ontario entered the twentieth century with no net debt; its only funded obligations, amounting to $3,053,000 and made up of old "railway certificates" and annuities,[1] were more than offset by the amounts which the Dominion government owed to Ontario. But when the province began to build its own railway line and hydroelectric system it began to borrow. By the end of 1914, Ontario had raised $9,960,418 (par value) on the domestic market, and $17,801,501 on the London market. Through the Bank of Montreal it had also sold treasury bills in both countries. By this time the present value of its railway certificates and annuities was $3,559,557; as most or all of those were domestic obligations, some 40 per cent of Ontario's funded indebtedness was domestic indebtedness. Further, as Table 4 reveals, most of this indebtedness was incurred at a time when the Canadian boom was at its height. It is clear that, even in years when the yields from direct investment were high and when chartered banks shunned provincial securities, there were domestic purchasers for these relatively expensive provincial bonds. Furthermore, and in spite of the competing attractions of direct investment, domestic finance was not always more expensive than London finance. Indeed, in 1911 and 1912 Ontario had found it cheaper, while in 1909 it was not more costly. Only in 1913 and 1914 did Ontario's cost of borrowing at home rise above the cost of borrowing overseas.

Almost all Dominion loans and most provincial loans were floated abroad during the twenty years before 1914. In Australia this abstinence would have created a serious gap in the available supply of new placements —particularly but not exclusively in the holdings of trust funds. In Canada this gap was filled by a great flood of municipal securities. Unfortunately there are no official statistics covering Canadian municipal debt before 1914, and trustworthy private computations do not exist. Fortunately there are unofficial statistics for the flow of new issues. Because these statistics cover only the period of rapid expansion when the flow of funds from London was heavy, they almost certainly understate the stock of municipal debt which was held in Canada at the end of 1914. But they do reveal that a surprisingly large proportion of the new municipal issues was taken up at home—even though provincial governments did not make loans to municipalities in Canada, as state governments did in Australia. During the years for which statistics are available, the total of Canadian municipal issues was $309,000,000, of which $92,600,000—nearly 30 per cent—had been taken up in Canada.[2] Even in 1913—a year of "stringency"—Canadians took up $25,000,000 in new municipal bonds.

1. J. Castell Hopkins, ed., Morang's Annual Review of Canadian Affairs, 1901 (Toronto, Morang, 1902), p. 185, citing Royal Commission on the public accounts of Ontario.

2. Computed from E. R. Wood's Annual Survey of the Bond Market.

Table 4
Ontario: Sales of Provincial Securities, 1907-14

In London				In Canada		
Amount £ thousand	Coupon rate	Price of issue		Amount $ thousand	Coupon rate	Price of issue
1,200	4	--	1906) 1907)	3,000,000	3-1/2	--
nil	--	--	1908	nil	--	--
820	4	102	1909	2,070	4	102
nil	--	--	1910	1,430	4	102
500	4	101	1911	290	4	102
200 100	4 4	101.375) 100)	1912	1,438.3	4	102
20.5	4	101.125	1913	1,770.3	4	99.5
817.3	4-1/2	100	1914	1,205.0	5	100

Source: Ontario Public Accounts

Australian municipalities, like Australian states, relied principally upon domestic sources[1] of finance between 1895 and 1914. In 1915, 78 per cent of their bonded debt had been floated at home, and an additional 7 per cent consisted of loans from state governments, so that only 15 per cent of municipal borrowing had been arranged overseas.[2] Though no comprehensive figures are available for 1895 or 1900, at the beginning of the century the Australian municipalities seem to have been equally independent of the London new issue market.

The relative absence of Australian state and municipal loans left the London market ready to absorb Canadian securities—particularly the Dominion securities which were substitutes for Australian securities in British trustee portfolios, but also the respectable securities of the provincial governments. On the other hand, because the Canadian senior governments failed to develop sources of domestic finance, their frequent recourse to the London market may have raised the cost of funds for other borrowers—particularly for Australian governments, which had once borrowed so extensively in London. Thus the volume of Australian governments' overseas borrowing was a function not only of relative interest rates in Australia and Britain, and of the Australian financial structure, but also of the Canadian financial structure—which pushed Canadian governments into the London market. Conversely, if Australian governments had not enjoyed a complaisant domestic financial structure their more frequent recourse to the London market might have forced Canadian governments to develop sources of domestic finance.

It is impossible to determine whether these reciprocal effects were significant, or whether they could possibly have been significant if the domestic circumstances of the two colonial economies had been different. Whatever the absorptive capacity of the British new issue market may have been in reality, it is fairly clear that the London issue houses thought they knew what it was, and that the actual flow of Empire securities jammed up sufficiently often to worry them. While nothing is proved by the fact that Canadian and Australian issues were frequently in the underwriters' hands for considerable periods, this fact suggests that the governments of either country could have raised more London funds only at higher cost, if only because the issue houses would have demanded higher fees and higher yields to sweeten the issues for themselves and for investors. The financial structures of Australia and Canada, reflected in very large London

1. In addition to the purchasers we have already discussed, the Commonwealth Bank and the Melbourne Tramway and Omnibus Company also lent significant sums to municipalities. For details of the former institution's municipal loans, cf. Australian Insurance and Banking Record, July 21, 1913, p. 579; December 21, 1914, p. 1039; September 21, 1914, p. 780. For the latter, ibid., August 21, 1913, p. 689; February 21, 1911, p. 90.

2. Computed from Australian Financial Statistics, with assistance from the Stock Exchange Yearbook.

sale of stock and treasury bills over the Treasury counters. These two sorts of securities were available from several state Treasuries throughout our period, usually at par. Of course, par issue implied a willingness to adjust the nominal rate of interest. In all states this was the practice; the terms of tap issues were adjusted to the condition of the local money markets and to the changing requirements of governments.[1]

The flow from the Treasury taps was sufficiently vigorous to annoy the brokers in Melbourne and elsewhere; accustomed to a jobber's margin as well as a broker's commission on the handling of government stock, and believing that they had rendered important assistance in the early issues of governments and municipalities, in 1903 they criticized "the practice adopted by several of the State Governments in placing parcels of stock, Treasury bills, or debentures with individuals and institutions privately..."[2] But the actual value of their assistance was doubtful. As the Australasian Insurance and Banking Record had earlier remarked:

> How far is the assistance of brokers of value in acting as jobbers to take up a portion of a loan, thereby assuring its success? Generally assistance of this kind has not been wanted in Melbourne, although in one or two occasions the brokers as jobbers have obtained liberal allotments.[3]

There is no sign that spasmodic opposition from brokers weakened the Treasurers' attachment to a cheap and convenient source of finance.

These methods of Treasury issue—the steadily flowing tap and the

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noted that underwriting was occasionally used when a state government floated a domestic loan. But it was infrequent, and sufficiently unusual to evoke comment. For instance, see Australasian Insurance and Banking Record, February 20, 1907, pp. 116-117—Victoria loan of £1,500,000; ibid., February 21, 1911, pp. 78-90. The evidence suggests that the cost of making these domestic issues was lower than the cost of London issues —in spite of the smaller size of the domestic issues. After 1900, Australian issues in London were invariably underwritten, at a cost of about 1 per cent. Other charges might add an additional 2 per cent or 3 per cent. On a domestic issue the Treasurer generally avoided the cost of underwriting, as well as the British stamp duty.

1. In New South Wales, for instance, the yield on tap treasury issues gradually rose from 3 per cent in 1896-1900 to 4 per cent after May 1912, as local and London rates stiffened. R. L. Nash, Australasian Joint Stock Companies Yearbook, 1913-14 (Sydney, Critchley Parker, 1914), pp. 6-9.

2. J. B. Were and Son, The House of Were, 1839-1954 (Melbourne, privately printed, 1954), pp. 145, 152.

3. April 20, 1901, p. 253.

borrowings by Canadian senior governments, and in small borrowings by Australian governments, influenced the international allocation of capital by influencing the offerings of both countries' governments on the London markets.

Between 1895 and 1914 all levels of Australian government relied heavily upon the Australian domestic capital market. Though not unknown to specialists, this fact has been neither observed nor explained. During the same period the Canadian senior governments relied chiefly upon overseas borrowing, but the government of Ontario and the municipalities were largely financed on the domestic capital market. By concentrating on the financing practices of the senior governments, scholars have tended to overlook the very important share of finance which these junior governments obtained at home. This error has led them to assume that the Canadian new issue market was wholly unimportant. This section has shown that in both countries the domestic capital markets were sufficiently well developed to provide substantial shares of governments' fiscal needs. Succeeding sections will show how the funds were provided.

4. Methods of Issue

The issue of securities need not be easy in a financial system which lacks an active stock exchange. This section shows how government securities were distributed in Australia and in Canada. The evidence deals only with municipal securities, Australian state securities, and the bonds of the Province of Ontario. It is shown here that imperfect financial mechanisms did not impede issue; in the concluding section of the essay it is argued that in Canada the development of the municipal bond market was of considerable importance for the later development of the corporate new issue market.

The Australian states borrowed regularly at home by converting their Treasuries into issue houses. The most common method of issue was the public offer of stock, debentures, or treasury bills. In each such case a minimum price was specified, though the offers were not usually underwritten. The States of Victoria and New South Wales enjoyed a specially favored position because their capitals were the financial centers of the continent. The smaller and poorer states—Queensland, South Australia, Western Australia and Tasmania--often offered their issues in Melbourne and Sydney, as well as on their own very narrow markets. The same procedure was followed by New Zealand, whose government frequently appeared on the Melbourne market. These "foreign" issues were often handled in part by Melbourne and Sydney banks, acting as agents for the Treasurer of the issuing state. If a loan was offered in several centers, tenders might be received by several such banks, as well as by the issuing Treasurer. The processing of the tenders and the allotting of issues, however, seem to have been handled by the Treasurers with little intervention or assistance from the banks.[1] An even cheaper method of issue was the

1. New South Wales Statistical Register, 1914-15, p. 430. It should be

occasional offer of securities for tender—provided the Australian community with most of the government securities which it acquired between 1895 and 1914. The domestic government debt also grew in a third way—through the programs of land resumption and closer settlement which the states pursued during our period.[1] As some of the closer-settlement bonds had been sold for cash to financial institutions, and perhaps to individuals, much of this indebtedness did not represent the direct exchange of land for securities. Consequently, we can conclude that no substantial part of the states' domestic debt[2] was created by the direct exchange of securities for property.

The Ontario government sold securities principally by Treasury tap issue without underwriting.[3] Thus its methods were like the methods employed by the State of New South Wales. In addition, Ontario occasionally placed blocks of securities privately by direct negotiation.[4]

Both in Canada and in Australia municipalities and boards of works "normally" borrowed by offering debentures for public tender. In Australia the method seems to have been introduced because the states had habitually used it, whereas in Canada it appeared because it was the common method in the United States.[5] In Australia, relatively small tenders seem to have been frequent; certainly the published reports of allotment do not suggest that a large public offering was often sold in a block to a single buyer.[6] In Canada each tenderer generally wished to take up the entire issue, and all the debentures went to the highest such tender. Even the largest cities habitually sold their bonds in this way. Without any of the complications of underwriting it protected the municipality by shifting the

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1. Discussed in Australasian Insurance and Banking Record, November 20, 1903, p. 892. For a summary of closer-settlement legislation, cf. B. Fitzpatrick, The British Empire in Australia (Melbourne, Melbourne University Press, 1941), pp. 376-377. Cf. also W. J. Campbell, Australian State Public Finance (Sydney, Melbourne, and Brisbane, Law Book Company, 1954), p. 278.

2. By 1915, cumulated spending on closer settlement made up only 4.5 per cent of the states' loan expenditures, and about 9 per cent of their domestic debts. Finance, No. 8, Table 29.

3. Details are to be found in the Public Accounts of Ontario for 1915 and preceding years.

4. See below, p. 34, note 5.

5. Investment Bankers Association of America, Proceedings of Second Annual Meeting, 1913, pp. 62-63.

6. But for an exception, Australasian Insurance and Banking Record, March 21, 1910, p. 187.

risk to the successful tenderer, as he became responsible for the final placement of the issue. In Australia, where "block bidding" was rare and where the jobbers were not willing or able to bid for large issues themselves, underwriting was widely used after 1900 by such large borrowers as the Melbourne Metropolitan Board of Works, the Geelong Board of Works, and the Corporation of Melbourne itself.

The public issue of Australian municipal securities had begun well before the beginning of our period, but in a sense the system had not matured until Melbourne, the largest city on the continent, made its first public offering at the end of 1900.[1] Thereafter there were always two or three larger offerings every year, as well as a considerable number of smaller offerings. Most, though not all, of these municipal issues were offered in Melbourne. This concentration reflected in part a greater availability of loanable funds in this center than elsewhere, but it chiefly reflected the fact that Victorian municipalities had more responsibilities than municipalities in the other five states. Though in Melbourne there were a few jobbers who specialized in municipal securities, and though these jobbers occasionally bought issues which were offered elsewhere, there is certainly no reason to think that borrowers came to Melbourne because a specially attractive mechanism of issue existed there.[2]

The elements of a municipal new issue market had come into existence in Canada before the beginning of our period. The chartered banks had conducted a bond business ever since Confederation, and perhaps since an earlier date[3] Montreal and Toronto brokers had begun to act as bond dealers, buying and selling en bloc; several of the important bond houses had already been established by 1890,[4] though their early dealings were "largely confined to ... municipal and government bonds."[5] After 1896 several new firms were formed, and turnover increased greatly, but development proceeded upon lines which were clearly laid down by that date.

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1. Australasian Insurance and Banking Record, December 21, 1900, pp. 946, 949.

2. Between the beginning of 1900 and the end of 1914, the Australasian Insurance and Banking Record recorded nearly £ 10,000,000 in domestic public issue of Australian municipal securities. This appears to account for about one half of the increase in Australian municipal bonded indebtedness during this period.

3. Select Standing Committee on Banking and Commerce, 13-14 Geo. V, 1923, Proceedings, pp. 513-514: evidence of Sir Edmund Walker, President of the Canadian Bank of Commerce.

4. A. R. Ames and Company was founded in 1889, and Central Canada Loan and Savings in 1884.

5. Canada, Royal Commission on Banking, Report, p. 27.

To handle the flood of municipal debentures no institutional innovations were required—merely an enormous expansion of the existing institutional framework for long-term municipal borrowing. In 1909 a Canadian municipality could expect to receive about twelve bids for an offering of securities. There were then about fifty Canadian bond houses in the market as well as some dozen Canadian banks, insurance companies,[1] and trust companies. In addition there were about eight New York and London houses which occasionally took part,[2] but the contemporary reports indicate that their bids were rarely successful.

It is extremely difficult to consider just how much of the municipal new issue business was handled by the chartered banks, and how much was handled by the bond houses which became even more numerous and active after 1900. Consider the following statement, tantalizingly equivocal, made by the General Manager of the Canadian Bank of Commerce:

> As to municipal bonds, with so many branches we are often asked to help the municipalities in the negotiation of their bonds; sometimes we buy them out and out, or if the amount is large we purchase them in combination with others.[3]

It seems safe to say that before 1914 the Canadian banks made little active effort to develop their bond business. Some banks probably bought most of their bond inventories from bond dealers, rather than from the issuing municipalities,[4] while there is little doubt that insurance and trust companies dealt principally with the bond dealers and only infrequently with the banks.[5] The only relevant statistics are ambiguous, partly because bond houses occasionally shared responsibility with banks but chiefly because in the context the exact meaning of the figures is not altogether clear. From 1900 through 1904 Dominion Securities Corporation, then the largest bond house in the country, "purchased entire issues to the par value of $9,301,000, and participated in purchase of, and had the selling rights on the Canadian

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1. From the beginning of 1900 through 1908, Canada Life obtained 33 per cent of its new securities directly from the initial vendors. Royal Commission on Insurance, Minutes of Evidence, p. 972.

2. Monetary Times, April 10, 1909, p. 1831.

3. U. S., National Monetary Commission, Interviews, pp. 127-128.

4. Select Standing Committee on Banking and Commerce, 3 Geo. V., 1913, Proceedings, pp. 235-239: evidence of Joseph Henderson, Vice-President of the Bank of Toronto.

5. Report of the Superintendent of Insurance, 1910-14: "List of Securities Bought and Sold"; Royal Commission on Life Insurance, Minutes, pp. 984-985.

market, of $33,767,000, or a total of $48,077,000 while corporate issues in Canada handled by other dealers amounted to only $9,588,000 during the period..."[1] The speaker, George A. Cox, knew better than anyone else what the flows of securities might be: he presided over the Canadian Bank of Commerce and over the Dominion Securities Corporation, as well as over Canada Life. But did he mean to include the banks with the "other dealers"? Or does this figure purport to cover only the bond issues themselves? Unfortunately Senator Cox does not tell us, and unfortunately the other senators were too somnolent to ask him for clarification.

Whichever institution was responsible for the distribution of a Canadian municipal issue, the process was entirely a private one. Canadian municipals, unlike Australian, were not listed on any domestic stock exchange. Hence the dealer could not feed them gradually on to an impersonal market, but had to sell each debenture by personal negotiation. Early in our period this necessity had led to the growth of nationwide sales networks[2]—and to the forming of close ties with life insurance companies.[3]

Though listing could not have made Australian municipal securities significantly more liquid than the unlisted Canadian municipal securities were, nevertheless the practice of listing Australian municipal issues is interesting because around the Melbourne exchange arose a few pale shadows of the bond houses which for Canadian municipal finance were so very important. In Melbourne there were a few brokers who specialized in handling municipal securities. They appear most frequently in the contemporary press as the underwriters of issues.[4] They also bought smaller issues of more remote municipalities, particularly in Western Australia. In so doing they were behaving just as the much larger and more active Canadian bond houses were behaving—buying up blocks of municipal securities in remote areas and placing them in the financial centers of the country. One even gets the impression that for a few municipalities these Melbourne

1. Canada, Senate, Debates, 3d Session, 10th Parliament, 1906-7, p. 551 ff. These figures are said to exclude "all industrial issues," and all issues of Canadian corporations whose operations were overseas. They may or may not include the issues of public utilities.

2. Royal Commission on Insurance, Minutes, p. 971: "[Dominion Securities Corporation] have a staff of men travelling on the road between the Atlantic and the Pacific, selling securities..."

3. Ibid., p. 972: From January 1900 until the middle of 1908, 12 per cent of Canada Life's new securities were bought from Central Canada and 32 per cent from Dominion Securities; both companies were owned by the president of Canada Life.

4. Australasian Insurance and Banking Record, April 12, 1913, p. 290; June 21, 1912, p. 469; December 21, 1908, p. 1027; April 20, 1905, p. 255; November 20, 1908, p. 921.

brokers were the customary channels through which issue was made. But as these municipalities were both few and small, the turnover in these embryo bond houses must also have been small. Even their underwritings were not really large or numerous. Such heavy borrowers as the Melbourne and Metropolitan Board of Works usually arranged for an underwriting by their bankers, while though Melbourne itself used the brokers' underwriting services at least once it also was more likely to employ the banks.[1] By 1909 it could be said that "the practice of underwriting has obtained so strong a hold that difficulty will be experienced in any attempt to break it."[2] But the specialist brokers handled only a part of this business. By 1913, even the Commonwealth Bank was beginning to underwrite municipal issues.[3]

Because a Canadian municipality infrequently sold its debentures directly to the final holder by negotiation, a much larger proportion of all new issues passed through the bond houses in Canada than through the specialist brokers and the stock exchanges in Australia. In the absence of any large Dominion or provincial domestic funded debt, and given the cost and inconvenience of acquiring large blocks of securities in London or New York, the rapidly growing insurance and trust companies could be relied upon to absorb large quantities of municipal debentures at regular intervals. But though their assets grew rapidly, these fiduciary institutions could not absorb any very large percentage of new municipal issues in Canada. No financial corporation played as important a role in Canadian municipal finance as the Australian Mutual Provident Society did in Australia. The larger part of the bond houses' dealings were with the wealthy individuals to whom the boom had given high incomes.

Even in Canada some cities made efforts to sell bonds without relying on public tenders, bond houses, or banks. These efforts seem to have occurred particularly when bank loans were less freely available and when tenders were fewer and less attractive. Between 1895 and 1914 there were two such periods—after the American panic of 1907, and during the worldwide "stringency" of 1912-1913. As the Canadian cities needed more finance in the latter period than in the former their devices were naturally more numerous and more varied in 1913 than in 1908.

During 1912 and 1913 many Canadian municipalities faced financial problems because banks were unwilling to extend credit on the basis of future bond sales, and because bonds became harder to sell. In 1909 a municipal issue could generally draw twelve tenders, but in 1913 three tenders

1. Australasian Insurance and Banking Record, March 21, 1910, p. 187; February 21, 1911, p. 205; June 21, 1913, p. 475; June 22, 1914, p. 472; June 21, 1910, p. 1460; February 21, 1914, p. 116; August 21, 1902, p. 649; November 20, 1908, p. 921.

2. Ibid., February 20, 1909, p. 95.

3. Ibid., June 21, 1913, p. 475.

was more usual and often no tenders were received. Some municipalities reacted by selling treasury bills.[1] But in the absence of any domestic short-term money market, treasury bills were not always easy to sell at home—especially as the banks were not always willing to extend their loans. Some treasury bills were placed in London,[2] but substantial quantities were also sold at home.[3] Some other municipalities adopted simpler methods of meeting the emergency. In the first place they began to pay their contractors in debentures; though American railroads had done this for decades, and though the smaller Canadian power companies had done it for years, the financial press severely criticized this "new departure."[4] It is probable that many of the contractors disposed of these debentures through the bond houses. Other municipalities, by-passing the bond houses completely, began to sell debentures over the counter.[5] The most interesting aspect of these sales is their success; even in small towns quite surprising sums were raised quickly.

5. Sources of Funds

It is well known that in a simple Keynesian model the act of investment generates an equal amount of savings through the effect of investment upon the level of income. In a fiscally sophisticated economy public capital formation can always be financed. But in an environment where central banking is absent, where commercial bankers are not complaisant, and

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1. This short-term paper was "almost an innovation" in Canadian municipal finance. "A complete list is not available as several banks negotiated some of the short-term loans and consider the business of their clients as a private matter." Monetary Times Annual Review, January 1913, p. 102.

2. By the end of 1912, the Monetary Times had heard of £ 4,477,344 in short-term paper, while the Bank of Montreal estimated that up to October 1912 Canadian municipalities had raised £ 4,770,000 in London in treasury bills. Ibid., p. 102.

3. Point Gray offered $1,200,000 of these, and the purchaser—Dominion Bond Company—offered them for public subscription in Canada. Monetary Times, August 14, 1912. This was one of the very few public domestic municipal issues in Canada during our period.

4. Monetary Times, July 19, 1913, p. 182; Canada, Superintendent of Insurance, Annual Report 1910 through 1914; Sun Life's acquisitions of securities.

5. In this way Vancouver raised $100,000, Chatham raised $33,000, Estevan, Kaslo, and Oakville raised varying amounts, and even little St. Thomas disposed of $114,161 in debentures. Monetary Times, December 20, 1913, p 956, and other issues of 1913. Toronto was selling its debentures over the counter at 4 1/2 per cent, though "very few people know that they can buy the city's bonds." Securities Magazine, June 1913, p. 7.

where the power of currency issue is severely limited, no government can safely assume that these savings will be accessible to finance the projects which it wishes to undertake. Hence it would seem that a fairly sophisticated financial mechanism must be a prerequisite for any governmental policy of full employment or growth-oriented investment. Neither Australia nor Canada possessed any such mechanism.

In neither country did the printing press suffice to finance the investment programs of the senior governments. Canadian currency legislation, modeled directly upon the British Bank Charter Act of 1844, permitted a small fiduciary issue of Dominion government notes but required dollar-for-dollar backing for every note beyond it. In 1895 the "fiduciary issue" was fixed at twenty million dollars, and the reserve behind this issue—in gold and guaranteed securities—at 25 per cent.[1] In 1903 the fiduciary limit was raised to thirty millions, but the reserve provisions were not changed.[2] Until 1914 there was no further change in the legislation.[3] Since the Dominion government held excess reserves at the beginning of our period, the note issue could be allowed to expand more rapidly than the gold base: between 1895 and the end of 1914 the Dominion's gold reserves rose by $80,815,000 while the note issue increased by $104,562,000.[4] Thus the note issue provided some twenty-four million dollars in purchasing power, of which more than half accrued during 1911, 1912, and 1913.[5] But compared with capital formation on Dominion account during our period this amount is not large.[6] Australia had no national note issue until 1910, when the Australian Notes Act authorized the Commonwealth government to issue a convertible paper currency. In the following year a gold reserve of 25 per cent was made mandatory, and in the same year the Bank Notes Tax Act imposed a prohibitive levy upon commercial bank notes.[7] Thereafter, the note issue was a Commonwealth prerogative, existing "as a convenience

1. 58-9 Vic., c. 16 (Dominion).

2. 3 Edw. VII, c. 43 (Dominion).

3. R. C. McIvor, Canadian Monetary Banking and Fiscal Development (Toronto, Macmillan, 1958), p. 65.

4. Computed from Canada Year Book, 1918, pp. 513-515.

5. Ibid.

6. From 1901 to 1915, the Dominion government's gross capital formation was $444,400,000. K. Buckley, Capital Formation, Table XIX.

7. G. Sawer, Australian Politics and Law, 1901-29 (Melbourne, Melbourne University Press, 1956), p. 93.

for the public and as a painless source of revenue."[1] Though notes to the value of £ 9,573,738 were outstanding at June 24, 1914, a gold reserve of £ 4,106,767 was held against these notes.[2] Thus some £ 5,567,000 had been obtained from the printing press in four years—more than the Canadian government had extracted in twenty years. Revenue from the note issue in part explains the late appearance of a Commonwealth debt. The first inscribed stock act and loan act were not passed until 1912.[3] The revenue was so large because the British Bank Charter principle was not applied. When a commercial bank bought notes with gold the Commonwealth Treasurer could always issue three additional notes for every note he gave to the banks. In fact he did not go so far, though by the middle of 1914 he had reduced the gold reserve to 43 per cent of the note issue. Unfortunately the largest responsibility for public investment lay with the state governments, only one of which (Queensland) had issued Treasury notes before 1910 and none of which did so thereafter. Australian states could not finance themselves by issuing currency. Nor could the Canadian provinces, having given up the right of currency issue in 1867. In neither country could the emission of currency assist these levels of government on which the burden of social capital formation fell most heavily.

The banking systems were also far from helpful. Canada had no central bank until 1934. Though the Bank of Montreal was the fiscal agent of the Dominion it had no other central bank functions. The Commonwealth Bank of Australia was set up in 1912, under the Labour Government's legislation of 1911. Though owned by the Commonwealth, it functioned chiefly as another commercial bank until well after the end of our period. It was not even entrusted with the issue of Commonwealth notes. At June 30, 1914, it held £ 2,644,711 in government and municipal securities. These made up a significant proportion of its total assets, but an insignificant proportion of state debt.[4] The Commonwealth Bank, like the Australian note issue, financed the federal government rather than the states: an unknown but large proportion of the Commonwealth Bank's security holding consisted of Commonwealth inscribed stock, of which only £ 4,100,000 was outstanding in the middle of 1914.[5]

Nor could the federal and state governments in either country sell any significant quantity of bonds to commercial banks. Short-term loans were certainly made by the banks on occasion. But one has the impression

1. G. Sawer, Australian Politics and Law, 1901-29, p. 91.

2. Australia, Commonwealth Bureau of Census and Statistics, Finance, No. 9, Table 20.

3. Sawer, Australian Politics, pp. 93, 101.

4. Finance, No. 8, Tables 15 and 51.

5. Ibid.

that in Australia they were very infrequent, and that the Canadian Dominion and provincial governments did not incur continuous short-term indebtedness to the banking system. "Temporary borrowings" were indeed temporary, and were quickly paid off. As for long-term borrowing, Table 5 shows how insignificant this was. The Australian figures of column (1) include sizeable blocks of consols, and perhaps of foreign bonds, while the presumably more relevant figures of column (4) include municipal securities; municipal securities are excluded from the Canadian figures, but after 1900 provincial bonds are included. In spite of these discontinuities and incomparabilities, Table 5 does serve to show that banks held few government bonds both relative to funded debts of governments and relative to bank assets. In common with American and British banks in this period, the Australian and Canadian commercial banks did not welcome government bonds in their portfolios.

Table 6 summarizes the purchases of the principal Australian institutions. It is clear that the savings banks were dominant in all periods, and that the life insurance companies were the next most important unless the estimate of trustee company purchases is thought to be improbably low. But perhaps the most interesting aspect of Table 6 is the exceedingly small proportion of total securities issues which was not taken up by the savings banks and the insurance companies. Between 1895 and 1900, these two groups of institutions bought 90 per cent of local issues; their contribution was almost as high between 1905 and 1910, though thereafter it was sharply reduced. Over the entire period between 1895 and 1914 they took up 62 per cent of all local issues. The success of these intermediaries in an unstable export economy rested on the long-term nature of life insurance contracts, and on the special attractiveness of savings deposits in an economy where the commercial banking system was suspect. Insurance companies took up about one seventh of all new government local issues. Trustee companies took up some 12 per cent. But the savings banks took up nearly half of all local issues. The accumulation of savings deposits explains much of the Australian "achievement." Trust funds and insurance policies explain the rest.

Australian trustee companies were constrained in their choice of securities by restrictive legislation, by customary prudence, by the ill results of past experiments, and by the restricted alternatives which the domestic capital market presented to them. Real property, mortgages, interest-bearing bank accounts, and government securities were virtually the only assets which they could hold. Insurance companies were not constrained by legislation but company by-laws and prudence combined to make them almost equally cautious. Both groups of companies directed their rapidly growing assets more and more into government securities after 1895. The crisis of 1893 and its aftermath had demoralized the markets both in urban and in rural real estate, so that mortgage loans could not be made at the customary margins of security on the old terms. Drought increased the perils of mortgage lending. By 1900 the ruling rate on mortgages was about 4 per cent in Victoria, satisfactory mortgage paper was

Table 5
Government Securities Held by Commercial Banks

	Australian Trading Banks						Canadian Chartered Banks (at December 31)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Balance Sheets			Royal Commission					
Year	£000	Per Cent of Bank Assets	Per Cent of Commonwealth and State Funded Debt	£000	Per Cent of Bank Assets	Per Cent of Commonwealth and State Funded Debt	$000	Per Cent of Bank Assets	Per Cent of Dominion Funded Debt
1895	n.a.						2,830	.8	1.3
1899	6,000	4					4,779	1.1	2.0
1901	7,980	5	4				9,769	1.7	2.1
1910	12,714	8	4.8	4,292	2	1.7	13,103	1.0	5.0
1913	9,544	4.4	3.2	5,348	3	1.8	10,950	.7	4.0
1914	13,512	5.7	4.3	7,377	3	2.3	11,234	.7	3.7

Sources: Curtis: Statistical Contributions to Canadian Economic History, pp. 47, 65; Royal Commission on Monetary and Banking Systems, Report, pp. 326-327; Balance sheets most nearly preceding December 31, as reproduced in Australasian Insurance and Banking Record; Finance.

Table 6
Domestic Issues of Government Securities and Purchase by Financial Institutions, Australia (in thousands of pounds)

	Change in Domestic		Savings Banks		Insurance Companies		Trustee Companies	
	Commonwealth Debt	State Debt	Change in Holdings	% of Govt. Issues	Change in Holdings	% of Govt. Issues	Change in Holdings	% of Govt. Issues
1895-1900	nil	12,476	8,462*	68	2,774	22	1,290	10
1900-1905	nil	19,825	5,841	30	2,238	11	2,210	11
1905-1910	nil	23,831	15,292	64	5,262	22	2,460	10
1910-1914	5,884	27,886	16,288	58	2,097	7.5	2,580	9
1895-1914	5,884	84,058	40,893	47	12,371	15	8,540	12

*Includes "Treasurer's Certificate" for £3,711,000.

Sources: Balance sheets; Public Accounts; Finance, No. 8 and earlier issues.

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scarce,[1] and trust and insurance companies had begun to move heavily into government bonds.

This shift was not fully maintained in later years, though in 1914 the life insurance companies held a much larger proportion of their assets in the form of government securities than in 1896 or even in 1900. Though their interest in the mortgage market revived after 1910, they continued to be heavy net purchasers of government securities in each year of our period.

The shift to government securities involved a shift to municipal securities. Between 1895 and 1914 the Australian Mutual Provident Society, behemoth of the insurance industry, lent £6,187,000 on the security of municipal taxes.[2] The accounts of the other insurance companies and trustee companies do not segregate municipal securities; however, there is indirect

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1. See the complaints of over-liquidity in the annual reports of Australian Mutual Provident Society, 1898 and later years. Reprinted in Australasian Insurance and Banking Record, May 19, 1898, pp. 362-364, and later years.

2. From balance sheets of December 31, 1898, and December 31, 1914.

evidence which suggests that some smaller insurance companies were also much interested in municipals. Some of these loans went to municipalities while others went to boards of works; some were arranged by private negotiation[1] while others were the result of successful bidding in public offerings[2] and of purchases on the open market. When an issue was small and tenders were few, the Mutual Provident Society frequently took the entire offering into its own portfolio. The smaller insurance companies seem to have been less able to digest entire issues.

The savings banks were of varying importance in the municipal bond markets of the various Australian states; since they rarely made interstate purchases, their acquisitions were naturally limited not only by law and custom but by the intrastate flows of new issues. At the national level their importance was considerable, for they had supplied nearly 30 per cent of municipalities' domestic external finance.[3] Though smaller than the apparent contribution of the Australian insurance companies, and considerably smaller than the contribution of savings banks to the financing of state governments, this flow of funds was not unimportant to the municipalities of some states.

The strength of the Australian savings banks, and the restricted investment alternatives of the other Australian financial intermediaries, all served to reduce Australia's overseas borrowings during our period. Furthermore, the strikingly regular growth of deposits ensured that some funds could always be obtained from the savings banks and that repayment would almost certainly never be necessary.[4] But we must not conclude that the state treasurers consciously used their power to extract cheap loans from the savings banks. The states were well aware that the savings banks did compete for deposits with other institutions; since government securities made up the larger part of every savings bank portfolio, the resources of the savings banks would grow more slowly if the yield on these

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1. For examples, Australasian Insurance and Banking Record, March 20, 1905, p. 171; September 20, 1902, p. 740; February 20, 1909, p. 89; October 20, 1912, p. 860. On two such occasions the Australian Mutual Provident Society lent Sydney £ 500,000; loans of £ 100,000 and more were not uncommon.

2. For example, ibid., April 21, 1910, p. 305; May 21, 1910, p. 365; December 21, 1910, p. 1023; June 21, 1910, p. 487.

3. In 1914 the Australian savings banks held municipal securities, excluding the issues of boards of works, to the value of £ 3,019,472. This sum was 28 per cent of the municipalities' domestic borrowings. Computed from Finance and from balance sheets.

4. During 1903 and 1904 the funds grew much more slowly than usual. For a very revealing comment on some resulting difficulties in state finance see Australasian Insurance and Banking Record, January 20, 1905, p. 1.

securities were forced out of line with market rates of interest. Whatever the interest elasticity of savings deposits may have been, with imperfect knowledge the state Treasurers could hardly have dared to take the risk. There is no evidence to suggest that they regularly borrowed more cheaply from the savings banks than from other institutions or from individuals.

The real explanation for the states' violent opposition to the Commonwealth Bank is its possible effect on the availability of long-term finance through the savings bank system. In the following "memorial" a great deal of verbiage is initially set forth, but the essential fear finally appears:

> Summarizing these positions, we would urge that the establishment of a Commonwealth Savings Bank would result in the duplication of system and control; in the division of capital and profits; in the reduction of the public facilities and possibly of interest to depositors; in increasing expenses and possibly adding to interest on loans. Most important of all, it would lead directly to the embarrassment of the Government of the States in carrying out their policies of internal development.[1]

"Internal development" is, obviously, a euphemism for "loans to the states and loans to the State land banks."

In spite of the various restrictions on the size and yield of savings bank accounts, the accounts were obviously attractive placements—far more attractive than accounts in the Canadian savings banks. They were attractive partly because no other placement offered so adequate a combination of yield and liquidity. The trading banks generally paid interest only on "fixed deposits." These accounts could not be withdrawn for some stated period—generally six months or longer—while savings bank deposits were payable on demand, or after very short notice. This liquidity, compensating for any shortfall in savings bank yields, decreased the competitive power of the trading banks' fixed deposits.[2] In addition, public confidence in the trading banks had been severely shaken by the catastrophe of 1893, in which the larger part of the Australian banking system became illiquid. Reconstruction followed,[3] but frequently deposits were frozen for

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1. Memorial prepared by Jas. A. McGowan, Premier of New South Wales, and J. Murray, Premier of Victoria. Sent to Commonwealth Prime Minister, November 29, 1911. Reprinted in Australasian Insurance and Banking Record, December 21, 1911, p. 1022.

2. In 1895 the Australian savings banks held £20,292,000 on deposit, and in 1914 their deposits were £83,541,000. These totals were respectively 34 per cent and 90 per cent of commercial banks' interest-bearing deposits.

3. For an account of the original schemes of reconstruction, cf. C. Mennell, ed., The Australian Crisis of 1893; J. B. Were and Son, Australasian

long periods while reconstruction went on. This disaster increased the attractiveness of the government guarantee which most savings bank depositors enjoyed.[1] In view of the trading banks' unfortunate past record, these guarantees were of considerable importance to the growth of savings bank deposits.

The constitutions of the savings banks ensured that the larger part of newly accruing deposits would be lent to the states, whose investment projects had in part created them. Thus in any single budget period the states could borrow a large share of the new savings for which their investment projects were responsible. The savings banks did not attract all such savings, nor were all new deposits lent to the government. There was obviously a shortfall which had to be filled with finance from other sources. The existence of this shortfall insured that the governments would pay the savings banks a rate of interest which would be linked with the structure of interest rates in the private sector, where the governments had to raise the remainder of their finance. If the savings banks had been less well placed—particularly if the competitive power of commercial bank deposits had been greater—the states could not have extracted the same volume of finance from the domestic economy at the same low cost. Treasurers would have faced higher interest rates, more extensive foreign borrowing, or both. As there is no presumption that these techniques could have produced the same large flow of finance, there is no presumption that the level of public investment would then have been as high as in fact it was. Conversely, there is some presumption that because the savings banks' deposits were highly competitive placements the level of employment was higher than it would otherwise have been.

In Canada there were no obvious domestic escapes. The provincial governments did not control savings banks, and the Dominion government failed to maintain the competitive power of its system vis-a-vis the commercial banks' savings accounts. There was certainly a direct connection between the low fixed yields on government savings deposits in comparison with the higher and rising yields on mortgages and other securities after

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Banks: Financial Schemes of Reconstruction, Melbourne, 1894; H. L. Harris, Financial Crisis of 1893 in N.S.W. (paper given before the Australian History Society). Further reconstructions were occasionally necessary, and were reported in the Australasian Insurance and Banking Record.

1. Only the trustee savings banks of Tasmania, New South Wales, and South Australia lacked comprehensive state guarantees for most of our period. In New South Wales the government had been prepared since 1893 to guarantee a £50,000 loan to the trustee bank if a liquidity crisis should arise (Australasian Insurance and Banking Record, December 21, 1911, p. 1022), and in South Australia the government, frightened by the advent of the Commonwealth Bank, decided in 1913 to guarantee deposits in the Savings Bank of South Australia. The depositors in the Commonwealth Bank already possessed a guarantee from the federal government.

1905, and the decline in the resources of the government savings system. After 1906 no part of the savings which the Dominion's investments generated accrued to the Dominion.

Table 7
Canadian Savings Banks and Government Finance, 1895-1914

	(1) Deposits in Post Office Savings Banks and Dominion Savings Banks $ thousand	(2) (1) + Funded and Unfunded Dominion Debt Per Cent	(3) Government Securities Held by Montreal City and District Savings Bank $ thousand	(4) (3) + Funded Dominion Domestic Debt Per Cent
1895	44,450.5	16.5		
1900	53,149.7	18.4	1,528.3	18
1905	62,017.5	22.2	2,037.0	28
1910	58,264.2	18.1	2,547.8	53
1912	58,219.3	16.8	2,547.8	54
1914	55,567.6	15.5	nil	-

Sources: Annual Reports of Montreal City and District Savings Bank; Canada Sessional Papers; Public Accounts; Canada Year Book; Curtis, Statistical Contributions. Data at December 31 in Column (3); June 30 in Columns (1) and (2) before 1910, March 31 in 1911 and thereafter.

Though savings deposits provided a larger and larger proportion of the Dominion's external finance during the cheap money years between 1895 and 1905, thereafter their contribution steadily declined until by 1914 it was smaller than in 1895. Though government savings deposits rose from 1895 to 1905,[1] thereafter they grew little until 1908 and finally began to fall. Significantly, they became less and less important relative to the funded debt, and relative to the chartered banks' interest-bearing accounts —the alternative placement with which they competed most directly.

This relative contraction seems to have been the result of government policy. In the first place, Dominion Government Savings Banks were closed and their deposits transferred to the more inconvenient Post Office Banks. Thirty-two agencies were abolished between June 1888 and June 1909,[2] and this process of integration continued beyond the end of our

1. The actual peak was reached in 1907 when deposits were $62,581,200.

2. Monetary Times, June 19, 1909, p. 2263.

period. In the second place, the two government systems paid the same rate of interest as the chartered banks without offering the same facilities of easy withdrawal and checking rights.[1] In the third place, though the Post Office Banks had originally been intended to serve rural areas where chartered banks were absent, after 1895 the chartered banks vigorously pushed their branch networks into the country—particularly into the new West[2]—and energetically developed their savings bank business.[3] In the fourth place, if a savings depositor held his account in a chartered bank he became known to the manager and might thereby increase the bank's willingness to loan him funds in the future. As the government savings banks made no loans, no such additional benefit could accrue from a deposit in one of them. While the Dominion could hardly have overcome this objection without basic changes in the constitution of its bank, and while it could not prevent the chartered banks from opening branches, it could have increased the competitive power of its banks by offering a higher yield on deposits and by offering additional facilities. Its failure to do so must have resulted either from inadvertence or from a conscious decision not to compete with the chartered banks. Whatever the cause, this abstinence reduced the Dominion's reliance on local capital and increased still further its reliance on London.

For Canadian municipalities and for the Province of Ontario matters were very different. Though reliance on overseas funds increased during our period, domestic sources of funds were also heavily drawn upon. From the beginning of 1910 to the end of 1914, Canadian municipalities floated domestic issues whose par values aggregated $74,000,000, and Canadian provinces raised $9,600,000 at home.[4] For earlier periods the data are

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1. If a depositor wished to withdraw funds from the Canadian Postal Savings Bank, he was obliged to wait until his request had been acted upon in Ottawa; in due time the Department of Finance would mail him a check, which he could cash in a chartered bank.

2. The number of chartered bank branches rose from 641 in 1899 to some 3,000 in 1914. McIvor, Fiscal Development, p. 82, citing Canada Year Book, 1915, pp. 574-578.

3. "In some other respects the banks have been greatly benefited by the more universal adoption of the savings departments [which replaced illiquid deposit-receipts early in our period] ... it is reasonably certain that because of the change bank deposits have grown more rapidly than they otherwise would. Had there been no change in this respect it is pretty sure that the loan companies, trust companies, and Dominion government savings banks would have received a part of the gains in deposits..." H. M. P. Eckhardt, Manual of Canadian Banking, 1913 ed. (Toronto, Monetary Times Publishing Company), p. 54.

4. E. R. Wood, Annual Survey of the Bond Market in Canada, as reprinted

too imprecise to permit any but the crudest estimates of municipal issues. It is certain that the Canadian trust companies took up a large proportion of these issues. Unfortunately, their accounts and reports did not distinguish between government securities and other securities. Though the non-mortgage trust assets of these companies rose by some hundred million dollars from 1910 to 1914,[1] a very large proportion of this increase consisted of call loans and real property, as well as corporate securities in unknown quantity. The Canadian life insurance companies were known to be heavy purchasers. Their security holdings rose by more than twenty-five million dollars during this five-year period, of which at least half probably consisted of municipal securities.[2] Relatively small sums were also taken up by Canadian commercial banks and by fire insurance companies. It is clear that many millions of dollars were raised from the general public—even if one makes ad hoc allowances for the purchases of banks, loan corporations, and fire insurance companies. Unless one thinks that the trust companies swallowed a really vast proportion of these government issues, one must conclude that the market for government issues in Canada was not purely an institutional market.

It is not clear who bought Ontario government securities; the accounts of the insurance companies show very small holdings,[3] while the banks did not purchase and hold any significant amount.[4] Presumably the final holders were corporate trustees and cautious individuals.[5] Canadian

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in Cost of Living Report, p. 910; Monetary Times, January 25, 1908, p. 1218; January 16, 1909, p. 1220; January 15, 1915, p. 16.

1. Computed and estimated from Ontario Registrar of Loan Corporations, Reports.

2. Computed from Dominion Superintendent of Insurance, Report. The figures include both Canadian companies and foreign companies which were obliged to balance assets and liabilities in Canada.

3. Dominion Superintendent of Insurance, Reports (in Dominion Sessional Papers).

4. See above, Table 5.

5. The three million dollar issue of 1907 was apparently sold to the Bank of Montreal by private negotiation. When the first block of the 1909 issue was offered "on tap," the Monetary Times remarked that "the market for these securities is very limited." Indeed, nine months passed before the issue was fully taken up. The exact disposition was not disclosed, but the Treasurer later gave credit to the bond houses and financial institutions which took up part of the issue. The success of the offer was probably increased by the relatively low interest rates which prevailed in Canada during 1909. In that year a block of bonds was also placed privately with "a

dealers were not the only purchasers; American bond houses were known to have taken up some part of each year's offering. It was thought that Americans were energetic bidders for Canadian bonds only when "bargains" were available; that is, when yields were unusually high. Though there were sufficient bargains on the municipal bond market to attract American buyers in large numbers during 1913-14, Ontario bonds were sold on terms which could hardly have been especially attractive. Hence it is reasonable to think that American purchases, though continuous, were small relative to Canadian purchases.

At the beginning of this section it was suggested that because the Australian savings banks successfully attracted a sizeable share of new savings the level of employment was higher than it would otherwise have been. If true, this statement implies that the constitution of the Australian capital market served to increase the rate of economic growth. One must remember that the statement is true only if an increase in governments' overseas borrowing could not have offset any reduction in their ability to borrow at home. Its truth also requires assumptions about the behavior of private capital formation and capital imports on private account. Nevertheless, the statement is not inherently nonsensical.

It is much more difficult to make any similar claim in the Canadian case, where the public sector was relatively small and where there were much larger capital imports on private account. There can be little doubt that Canadian financial institutions encouraged capital import on public account and that their activities may therefore have raised domestic capital formation. Insofar as the Canadian boom required extensive social capital formation by municipalities, the Canadian financial system clearly assisted in the breaking of bottlenecks which might otherwise have impeded the growth process. Though these statements are problematical and cannot be documented, it is significant that one can make no alternative statements. That is, one can see no way in which the workings of the Canadian public securities markets might have retarded the growth process.

6. The Markets in Government Securities and the Evolution of New Issue Markets

The preceding sections of this essay have described the methods by which government securities were issued in Australia and Canada before 1914, the sources from which the governments borrowed, and the interrelations between domestic and overseas sources of long-term government finance. It has been shown that domestic finance was much more important than has hitherto been realized, that well-articulated domestic issue mechanisms had appeared by 1895 or soon thereafter, and that structural

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syndicate of banks, insurance companies, and trust companies." In later years further sums were raised privately. J. Castell Hopkins, Canadian Annual Review, 1909, pp. 163-164; Monetary Times, June 5, 1909, p. 2176; June 12, 1909, p. 2221; April 30, 1910, p. 1809; January 8, 1910; January 20, 1912, p. 338; December 7, 1912, p. 846.

differences between the Australian and Canadian economies influenced the evolution of these issue mechanisms. In this concluding section it is suggested that in both countries the evolution of a corporate new issue market was significantly influenced by the government securities market.

The Australian new issue markets were dominated by the issues of senior governments.[1] The Canadian new issue markets were not;[2] their turnover contained a far higher proportion of corporation issues, a much higher proportion of municipal issues, and a very much smaller proportion of provincial issues. In Canada the great volume of municipal issues provided a base on which a distribution system could be built. This system was necessary in a country where securities markets were thin. Through this system new corporate issues could be floated. Without this system the flotation of these issues must inevitably have been more difficult, if not impossible. In Australia, the state governments could readily issue their own securities without intermediation; there was little chance for investment bankers to specialize in the small municipals market. The importance of the Australian savings banks further lessened the scope for any intermediation. The Australian private sector may not have been sufficiently dynamic to require much external finance during this period. Nevertheless, it is clear that Australian institutional arrangements, heavily conditioned by the distribution of functions within the public sector and between public and private sectors, would not have facilitated any large flow of external domestic finance into corporate enterprise before 1914.

The Canadian bond houses were the principal initial purchasers of municipal and industrial bonds in the years between 1895 and 1914. They supplied securities to Canadian banks, insurance companies, and individuals. Though their own overseas sales were overshadowed by the London activities of the Bank of Montreal and the Canadian Bank of Commerce they sold large blocks of Canadian bonds in Britain, both by public issues and

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1. The domestic debt of the states grew by £71,700,000 between 1900 and 1914, while the domestic debts of the municipalities may have grown by some £9,500,000. Local issues of corporate securities, excluding mining securities, were no more than £13,000,000. Data from special compilation of local issues; Australasian Insurance and Banking Record; Finance; Australian Stock Exchange Intelligence; Stock Exchange Year Book.

2. Because Wood's data on bond issues are insufficiently disaggregated in earlier years, we can compare government issues with other issues only for the period 1910-1914. During these years the par values of domestic municipal issues summed to $74,000,000 and provincial issues were only $9,600,000. Over the same period new money raised by domestic corporate issues was about $285,000,000—including 20 per cent of Canadian Pacific issues during these five years. Data from special compilation of corporate issues; Annual Financial Review, Canadian; E. R. Wood, Annual Survey of the Bond Market in Canada; Monetary Times; Canada Year Book, 1933, p. 921.

by private negotiation. The dealers, and the promoters with whom they were allied, carried through most of the mergers and promotions whose securities so radically widened the range of securities available at home, and helped to attract sterling to Canada when these securities were issued in London. The bond houses predominated in the issue of preference shares and bonds. We have observed their importance in the issues of municipal securities; this steady flow of government issues, and the steady market which existed for municipal issues in the absence of any significant Dominion domestic funded debt, provided the bond houses with assured though limited income and with contacts through which industrial issues could be distributed and the call money for carrying them obtained. The desire for increased turnover led the bond houses to promote many of the mergers which occurred in Canada after 1908; the desire for easy and profitable marketing of securities led them to establish close relationships with life insurance companies, trust companies, and banks.

By 1909 there were about fifty bond houses. More and more bond houses were set up in the next few years; the financial press was full of "business cards," and by 1923 there were about 218 dealers in all.[1] Of the nine most significant firms at the latter date, only two had been set up after 1914.[2] The remainder dated from the prewar boom years or from even earlier periods.

Some bond houses had grown out of brokerage firms,[3] and maintained strong stock exchange connections throughout our period. In this group was the Toronto firm of A. E. Ames, a firm which was founded in 1889 and which was operating as a private bank and issue house by 1900.[4] In June 1903 the firm suspended, but reconstruction and a Dominion incorporation re-established it; Ames gave up the presidency of the Metropolitan Bank, which he had just floated, but his bond house continued to call itself an "investment bank." It also retained its stock exchange seat.[5] A similar

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1. H. P. Willis and B. H. Beckhart, Foreign Banking Systems (New York, Henry Holt, 1929), p. 320.

2. Ibid.

3. This is the group to which the Royal Commission on Banking referred in the following remark: "The Canadian bond business may be said to have begun in 1883-4 when several of the firms now engaged in the underwriting and distributing of securities were founded." Report (Ottawa, King's Printer, 1933), p. 27.

4. In the Canadian Year-book, 1903, p. 254, the Ames advertisement mentions both banking and bond-broking.

5. At the time of its collapse, Ames' firm had received $240,000 on deposit, having offered one-half to 1 per cent more interest than chartered banks or loan companies. These funds had been used for dealing in

Toronto firm was Pellatt and Pellatt, headed by Sir Henry Pellatt. This firm also concerned itself with broking and promoting; in particular, it had a great deal to do with the flotation of the Home Bank of Canada in 1905-06, and maintained close relations with the bank until after the end of the Great War.[1] Among the Montreal brokers were Hanson Brothers, which had been founded in 1883, and Rodolphe Forget. Like Pellatt, Forget had inherited an interest in the securities markets, for his father had been a leading Montreal broker for many years. Forget concerned himself with mergers —especially but not exclusively with steamboat mergers—rather than with bond dealing per se. But his firm occasionally acted as an issue house.

On the other hand were the bond houses which other financial institutions had spawned. The Ontario Securities Company, for instance, was set up in 1903 by the directors of the Continental Life Assurance Company.[2] A much more active member of this group was the Dominion Securities Corporation. A wholly owned subsidiary of the Central Canada Loan and Savings Company, it was set up in 1901 to take over the municipal securities operations in which the Central Canada had been engaged for some years,[3] and the industrial securities operations which it had recently commenced. Dominion Securities worked in close association with the Canadian Bank of Commerce and with the Canada Life Assurance Company, which were controlled by the same owners. In the thirteen years after its foundation it sold at least $100,000,000 of industrial bonds and shares,[4] as well as an

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securities. Monetary Times, January 15, 1904, p. 912. For the later activities of the incorporated firm, see its advertisement in Canada Today, 1911, p. 192.

1. Cf. Royal Commission to Enquire into and Report upon the Affairs of the Home Bank of Canada, Evidence and Report, Ottawa, King's Printer, 1924.

2. Royal Commission on Insurance, Report, pp. 95-97. The directorates of the two companies were closely interlocked, and the Securities Company was a large shareholder in the Insurance Company. Royal Commission on Insurance, Evidence, pp. 1397, 1402.

3. Ibid., p. 970: "The Central Canada has had the right to purchase or lend on any Canadian government or corporate security ever since it was incorporated ... in the early years of the company their business was confined almost exclusively to mortgage loans, but for many years the business has been more particularly in the purchase and sale of securities."

4. Its name appears on sufficient prospectuses to give a total of $15,000,000. However, from the end of 1899 until the end of 1905 its issues of corporate securities totaled $31,434,317, according to its owner. A very rough estimate of its total corporation business before 1914 is $100,000,000. Ibid., pp. 984-985.

indeterminate quantity of municipal bonds.[1]

In Canada, many of the commercial banks and bond houses acquired their initial experience in the municipal bond market. Industrial securities were added into them. Thus the machinery of distribution could serve two purposes. Because they were relatively free of legal or customary restrictions, the Canadian financial intermediaries could move massively into the corporate securities markets whenever the prospective speculative or investment returns were sufficiently favorable. Before 1905 they used their powers both to acquire corporate securities and to support the securities markets with call loans. Though some financial institutions withdrew from the corporate securities markets thereafter, rising incomes and boom psychology opened new opportunity to the bond houses. After 1909 they seized their opportunities at home and abroad. In the process they distributed a very large quantity of securities to Canadian and foreign individuals; they also provided new external finance to large and small Canadian businesses. They grew and prospered because the Canadian financial system was not heavily biased toward the agricultural sector and the public sector, and also because the public sector was so organized as to generate a flow of municipal securities which required intermediation.

1. In the period 1900-05 its municipal bond turnover was said to be $11,505,500. Royal Commission on Insurance, Report, p. 985.